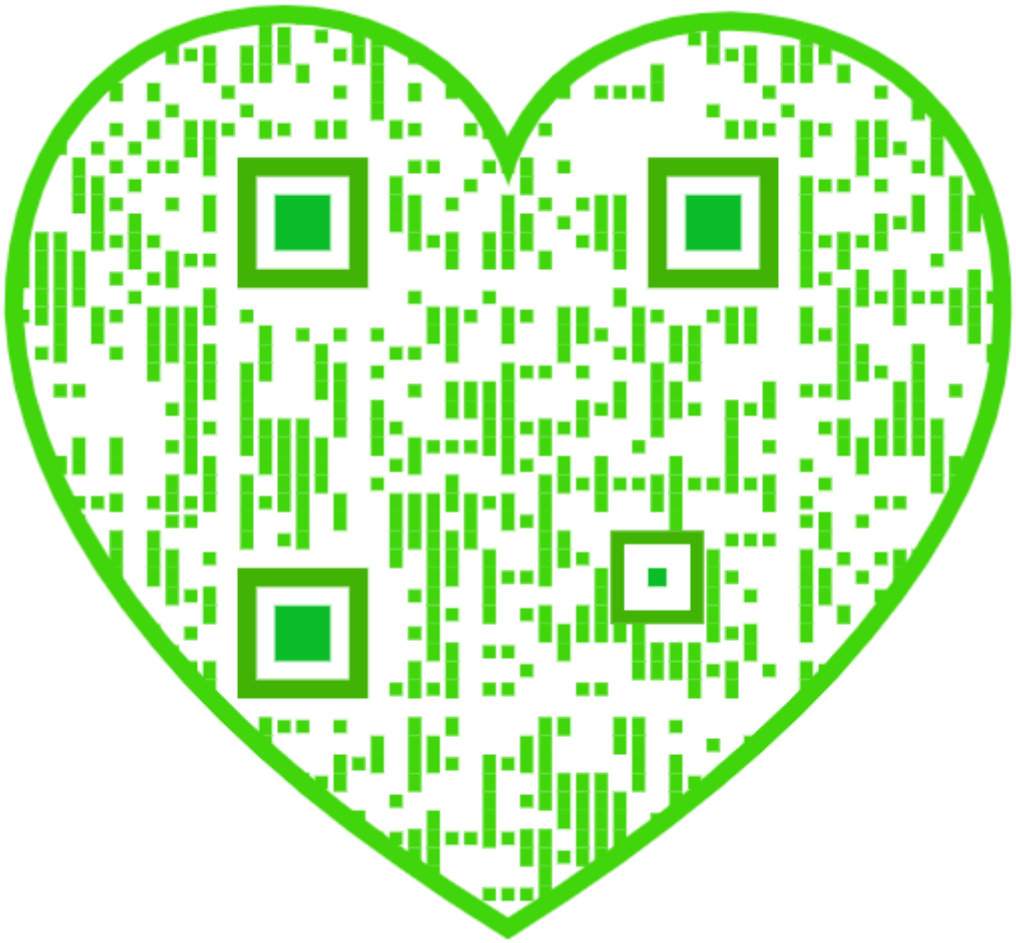
A COUNTRY READER
BOOK ONE

BUCHANAN AND STUBENRAUCH



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A COUNTRY READER

BOOK ONE

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A COUNTRY READER

BOOK ONE

BY

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AND

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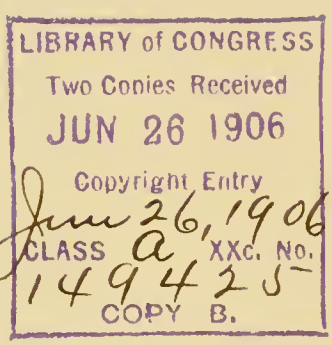

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PREFACE

In preparing this American edition of Mr. Buchanan's Country Readers, I have tried throughout to preserve the simple language of the English author. Naturally, many changes were necessary to make the book suitable for our American schools. Volume I is devoted entirely to farm animals, an arrangement which I think is highly desirable. Volume II will deal with the soil and crops.

As Mr. Buchanan states in his preface to the English edition, this book is not intended for very young children, but for the older children of both our rural and city schools; children who are able to read and understand the meaning of ordinary English words.

The value of reading — especially of reading aloud — in training the young mind is, I think, recognized by all. It is the aim of these readers to assist in this valuable training by presenting correct information about those things around us which we have found to be especially interesting to the child.

Children are interested in the natural objects with which they come in daily contact, and especially are they interested in animals and plants. We wish to hold and cultivate this natural interest by explaining things which the child can observe for itself, and which we hope may be of some practical use in the child's future life. We wish to create a desire to know more. The information given is therefore not intended to take the place of personal observation. The reading lessons should be supplemented by talks by the teacher, so that personal observation may be still further encouraged; for, after all, this is the most effective method of obtaining knowledge which will be retained without effort.

If there can be aroused in children's minds a personal and kindly interest in the animals and plants they see living and growing around them, and if some knowledge is given them of the part that each plays in the economy of the world's work, it will add to the interest in life, and therefore relieve all work, especially work in the country, of much of its weariness and monotony.

Due acknowledgment must be made for valuable assistance obtained by reference to the following works: Farmers' Bulletins, Nos. 96, 100, 106, 137, 141, 143, 159, and 184, of the United States Department of Agriculture; "Keeping

Goats for Profit," by Almont Barnes, in the Yearbook of the United States Department of Agriculture for 1898; "Mohair and Mohair Manufacture," by G. F. Thompson, in the Yearbook for 1901; Bulletin 76 of the Mississippi Agricultural Experiment Station; Curtis's "Horses, Cattle, Sheep, and Swine," and various articles in the "Farmers' Cyclopædia of Agriculture."

ARNOLD V. STUBENRAUCH.

UNIVERSITY OF CALIFORNIA,
BERKELEY, May, 1906.

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A COUNTRY READER

FARM ANIMALS

CHAPTER I

THE HORSE

The horse has been the servant of man for a very long time; so long is it, that we have no written record of when it began, but we do know that at one time the horse led a wild life and wandered in large herds over the great plains of the world.

When horses lived in this wild state, they had many enemies who tried to kill and eat them, but their special enemy was the grim gray wolf, with his never ending hunger and slow but untiring gallop.

Let us now try to picture a scene of those long bygone days.

We see a wide, undulating plain, stretching as far as the eye can reach, a plain mostly hard and dusty, with dry, wiry grass growing here and there; and we see a herd of wild horses

wandering about not far from each other, trying to satisfy their hunger with the dry, scanty herbage. And as we look we see a pack of hungry wolves, which are trying every device to creep as near to the horses as possible without being seen by them.

At last one of the horses, the leader or the lookout horse it may be, because of his keen eyesight, or because of his quick sense of smell, discovers his natural enemies, the wolves. Then with a loud snort and stamp of the forefoot, and with tail high in the air, he trots toward his companions. These signals of alarm are well understood by the herd, which at once ceases grazing, collects together, and gallops in a body toward the horizon.

Then the chase begins.

The wolves, with noses to the ground and tails in the air, strive to come up with their prey. These clever animals are up to all sorts of devices to accomplish this. The pack will divide. One portion will follow on the direct trail of the horses, another portion will try to head the horses off, so that they may turn them back. Some, after a time, will lie down to rest, while others will endeavor to bring the herd of horses round to where the resting wolves are lying in concealment, so that a fresh relay of rested wolves may take up the chase with

renewed vigor. The swiftest, soundest, and strongest horses are sure to escape, but the wolves hope that in the herd there may be one or more a little lame, short winded, or a little out of condition. The wolves have learned from experience that if there be such an unfortunate horse, it will not be able to keep up with the rest, but will go slower and slower in pace, till it lags behind its companions. The hungry wolves with their steady, untiring gallop will approach nearer and nearer, until the unsound or slower horse is dragged down, killed, and eaten by its pursuers.

Now you can at once understand by this little imaginary scene, that in the course of numbers and numbers of years the weak and unsound horses would be unable to escape their enemies, while those horses that were keenest of eyesight, quickest of hearing, soundest in wind, swiftest in pace, hardest in endurance, strongest in leg, would survive.

So it will be seen how this continuous destruction of the weaker members of the herds, together with the hard life on the immense plains which formed the greater part of Europe and Asia, helped very slowly and very gradually to perfect that form of life which we call a horse, — a form of life suitable for man to use in his wars, in his hunting, for his pleasure

in riding and driving, and for helping him to cultivate his fields, and for drawing his heavy loads.

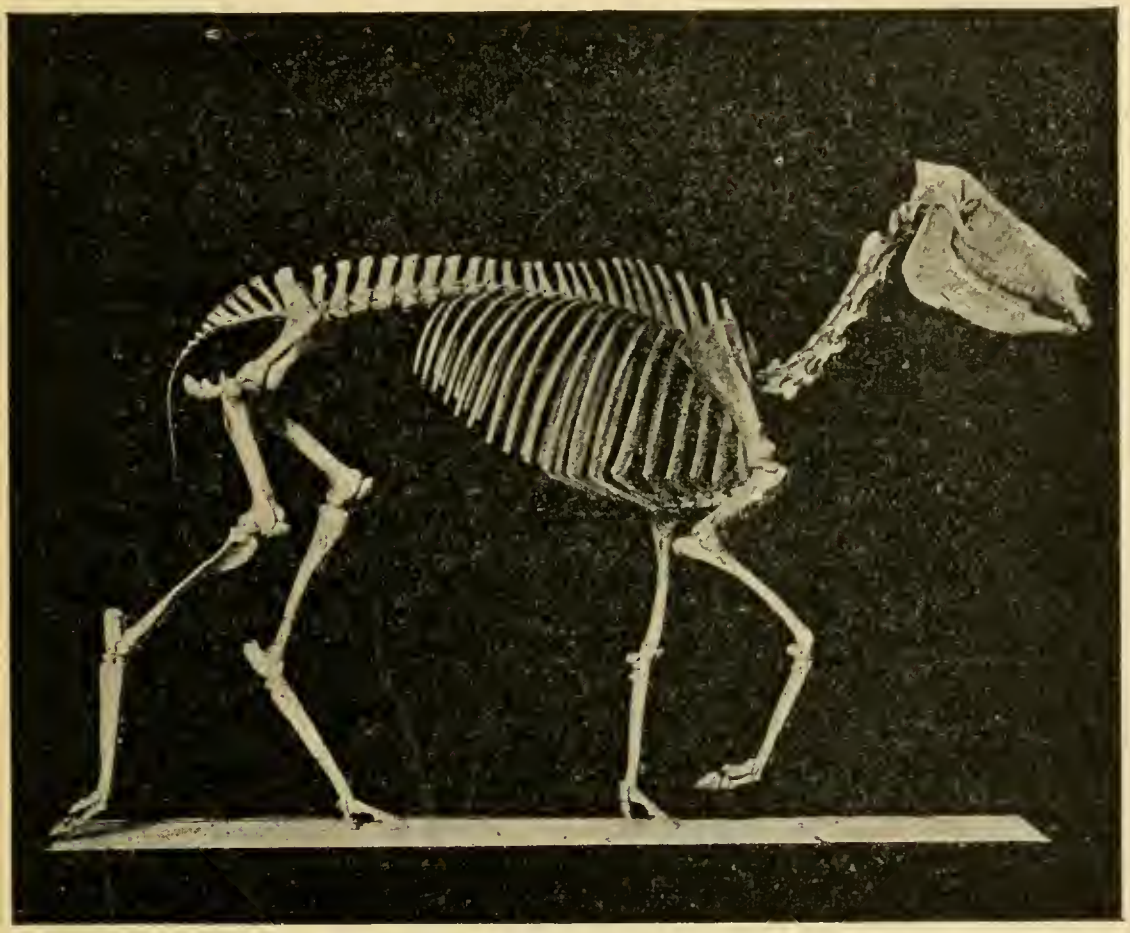
We do not know when man began to use the horse as his servant. Nor can we say for certain what was the exact color and appearance of these wild horses, because we possess no picture or written description of them as they wandered in their wild state. But some of their bones have been found. These have been pieced together by learned and clever men, and are now to be seen in our museums.

The Ancestors of the Horse

Not only has it been possible to find out what was the size and general appearance of the wild horses of remote times by a study of the bones which have been found, but the character of the prehistoric ancestors of the horse has been determined by a close and painstaking study of the *fossil* bones found in many instances embedded in the rocks. Gradually the fossil bones gathered here and there have been placed together by scientific men who have devoted their lives to this difficult work, which we call the science of *Palæontology*.

According to the fossils, the ancestor of the whole horse family was an animal about the size of a fox, which walked with four toes on the front

legs and three toes on the hind legs. As time went on and external conditions changed, this ancestral type, not larger than a fox, gradually developed into a form about the size of a sheep



HIPPARION OR GEOLOGIC HORSE.

or goat, which walked on three toes on both hind and fore feet. In course of time this form of vertebrate life treading the earth on three toes on each foot, was succeeded by a more direct ancestor of the horse, which in Europe is called the Hipparion. The Hipparion horse ancestor also possessed three toes, but only the middle one reached the ground; the other two toes on

each foot hung uselessly above, and on each side of the toe which came to the ground.

In the modern horse the useless hanging toes have entirely disappeared from the outside, and can be found only by feeling for the "splints" or rudimentary bones under the skin. The useful toe has gradually become rounded and strengthened and now forms the only support of the present-day horse, so what we now designate as the hoof is merely the development of the third remaining toe inherited from the ancient form of horse and modified to meet existing conditions.

Another set of appendages which are not now of any discernible use, but which are possessed by members of the horse family, are the black callous pads or "chestnuts" on the inside of the front and hind legs. The ass has two of these chestnuts high up above the knees on the fore legs. The horse has four: one on each fore leg just above the knee, and one on each hind leg just below the hock. These pads are found on wild horses and asses, and were, no doubt, of some use to the early ancestral forms. We can only conjecture what this use was, but it is supposed that the pads were originally glands, secreting some odorous substance, by which strayed members of the herd were enabled to regain their companions. That these pads are odorous is borne out by observation. Their

usefulness has long since disappeared, but they remain as inheritances from past prehistoric ancestors, and thus they aid us in tracing the evolution of the modern animals.

The wild horse had to live and exist on hard, dry plains with very little natural shelter, with water scarce and with fodder tough and wiry.

What structure better adapted to meet these conditions than the horse, with his great rounded third toe, or hoof, on the ground, together with his keen senses of sight and hearing, his well-proportioned frame and highly developed brain, and above all his speed, which on the slightest cause for alarm enabled him to distance all enemies.

The horse family includes not only the horse but also the ass and the zebra. The horse's call is the well-known neigh. The ass brays. The zebra makes a noise something between the bray of the ass and the neigh of the horse.

Was the appearance of these animals always as we see them to-day? The scientists have been able to piece the fossil bones together, thus giving us some idea of the form and the outline of the skeleton. But the fossils can give no idea of the color or outward appearance of these ancient animals.

We have seen that the fossil ancestor of the horse family was an animal about the size of a fox. From this ancestor there gradually evolved

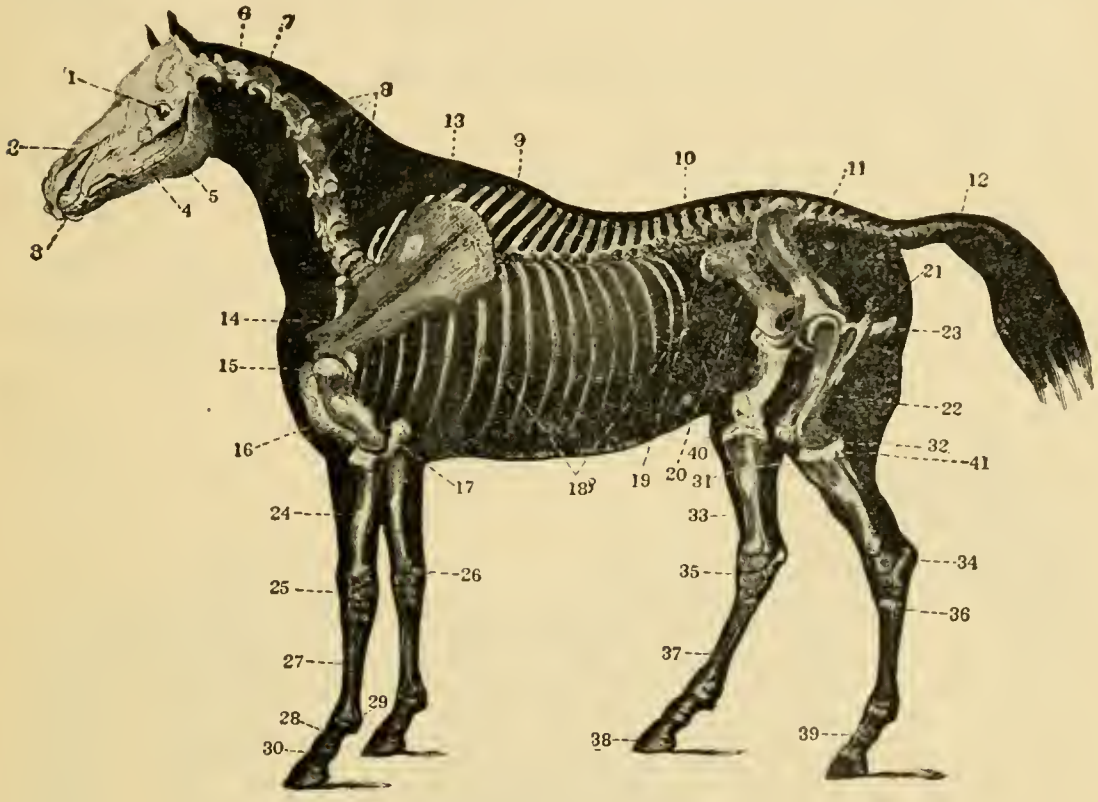
the three forms which we now know as the horse, the ass, and the zebra. These different forms were produced by individuals being placed under different sets of conditions. Thus one set of conditions evolved the distinct horse line, another set the distinct ass line, while still another set was responsible for the zebra line of evolution.

That these different forms are descended from a common type of ancestor is proved by the fact that wild horses have been captured which strongly resemble the ass. The form and appearance of the tail of these animals is partially that of the horse and the ass. Like the ass they had a black stripe down the middle of their backs. They had little or no forelock and the mane hung only partially. The head was large and the feet were distinctly ass-like.

No doubt many of our readers have seen a zebra, and will therefore remember his characteristic stripes. Some may have noticed also distinct zebra-like stripings on the front legs of some donkeys, especially when young.

We have thus seen that there are horses which have ass-like characteristics, and there are also asses with distinct zebra-like markings. These points, coupled with the fact of the similarity of the structure of their bones, may be taken as positive evidence of their close relationship.

Just as different conditions have brought changes great enough to produce the horse, the ass, and the zebra, so have the development and



SKELETON OF THE HORSE.

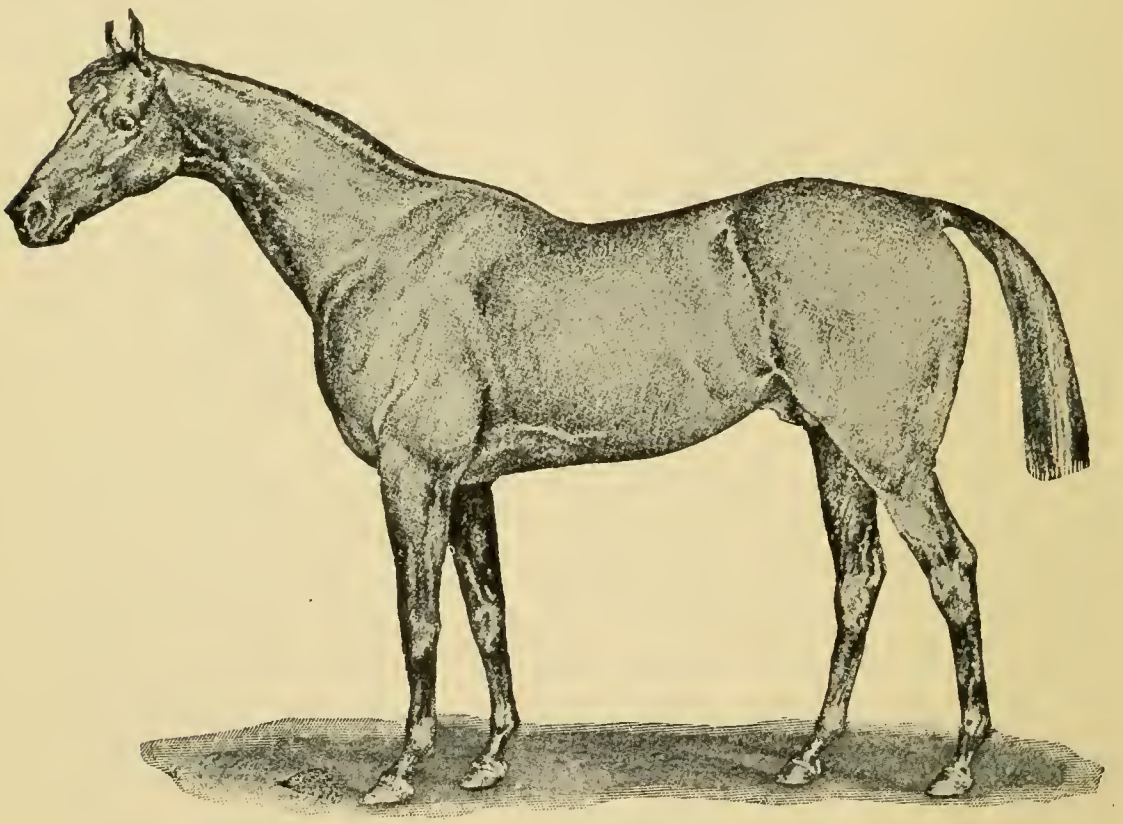
1. Eye cavity; 2. Face bones; 3. Incisor teeth; 4. Molar teeth; 5. Lower jaw; 6. First vertebra of neck; 7. Second vertebra of neck; 8. Cervical vertebræ; 9. Spinal processes of back; 10. Dorsal and lumbar vertebræ: 11. Sacrum; 12. Tail bones; 13. Shoulder blade; 14. Hollow of shoulder blade; 15. Upper end of arm bone; 16. Arm bone, or humerus; 17. Elbow bone; 18. Ribs; 19. Haunch; 20. Haunch bone; 21. Great trochanter; 22. Thigh bone; 23. Ischium; 24. Radius, or forearm bone; 25. Carpal, or knee bones; 26. Trapezium; 27. Cannon bones; 28. Pastern bones; 29. Sesamoid bone; 30. Small pastern bone; 31. Upper end of leg bone; 32. Stifle joint; 33. Leg bone, or tibia; 34. Point of hock; 35. Hock joint; 36. Head of small metatarsal bone; 37. Cannon of metatarsal bone; 38. Coffin bone; 39. Fetlock; 40. Patella, or stifle; 41. Fibula.

life in different climates and countries produced different types of horses. By selecting and breeding from these different types man has produced many classes or grades of horses. It would take far too long to discuss in detail

all these different grades, but it may be said that there are five classes of horses in most general use: (1) the Racing Horse; (2) the Riding Horse; (3) the Carriage Horse; (4) the Draught Horse; (5) the Ponies.

The Racing Horse

Under this heading two types of horses must be considered: the Running Horse or Thorough-



THOROUGHBRED.

bred, and the Trotter. Right here, some explanation of the term "Thoroughbred" should be made. Here in America some confusion has resulted from the use of the term for any class of

live stock which is *purely* bred. Thus we have in America thoroughbred cattle, sheep, swine, poultry, as well as horses. In England the name thoroughbred is applied to a distinct breed of horses, the running race-horse. In the following paragraphs, therefore, we shall use the English designation, and when we use the word "Thoroughbred," let it be understood that we refer to this particular breed of horses.

The thoroughbred is a descendant of the Arabian and Barb horses, and has been bred for speed and endurance. A thoroughbred, therefore, ought to have clean-cut, sinewy limbs, with long racing quarters, so as to allow the hind legs when galloping to stretch well under the body with the longest possible sweep. Its pasterns ought to be long and flexible, so that when the animal is cantering or galloping the motion is as easy as sitting in a rocking-chair. Its skin should be soft, its hair fine and velvety. A thoroughbred's head ought to show signs of refinement, and be well put on the shoulders, so that it is carried with an air of pride, spirit, and freedom. The head ought not to be too long, and ought to possess good width between the eyes. The nostrils ought to distend, so that after a good gallop they expand almost round, and show clearly the red inside, to allow the wind to come out clear, even, and strong. In other

words, a thoroughbred is said to possess good quality when it exhibits a fine shape, high spirit, and a courage and endurance that will cause it to persevere till it drops.

Many a courageous, high-spirited horse, at the bidding of its master, has galloped on, showing little or no signs of distress, till a quiver or uneven lurch of the body was the first sign to the rider that the noble beast had done all that it could, and it fell to die.

So beautifully shaped is the body for speed, so clean and hard the legs, so well knit the frame, so sound the wind and condition, so keen the eyesight, so courageous the heart, that these beautiful creatures are said to have galloped for a short distance as fast as an ordinary express train can travel when moving at its best, namely, sixty miles per hour.

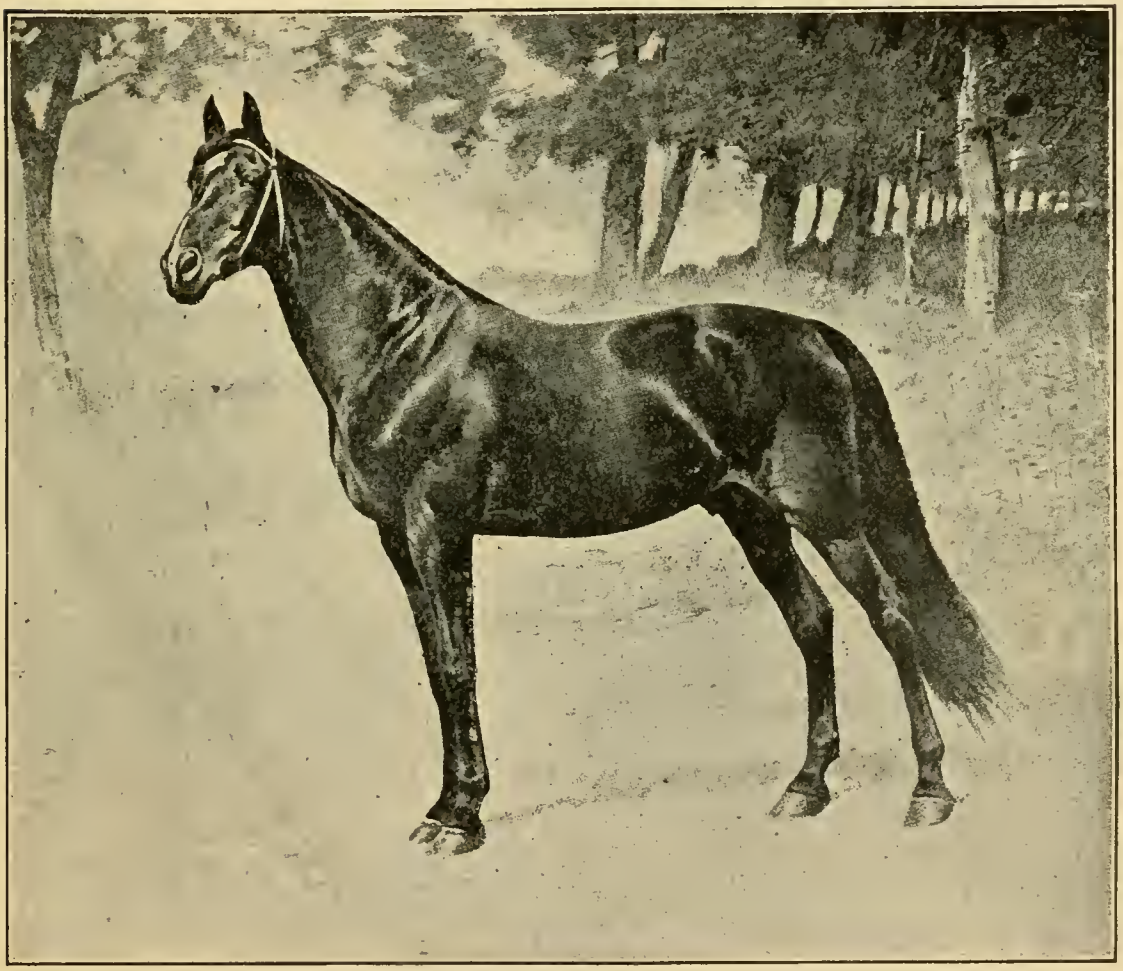
To produce such an animal as this means generations of careful selection and breeding, the best-known system of stabling, grooming, training, feeding, and caring for generally. In consequence of this careful breeding and training, these thoroughbreds are often very nervous, and therefore impatient and restless. If roughly and cruelly treated, their disposition or temperament is easily spoiled, and they become vicious and dangerous.

As these horses have been bred and trained

principally for galloping, they are bad trotters and walkers — they do not lift their legs well off the ground — and are seldom used for hunting or carriage work.

The Trotter

The trotting horse is purely an American development, although the animals from which



TROTTING HORSE.

this breed — it is now generally recognized as a breed — was originated, were English horses. The trotting gait is the result of most careful

training. But in order to attain the trotting gait it is necessary that the animal have certain tendencies or instincts — the trotting instincts, as they are called.

The trotting instinct is secured by the most careful breeding. The trotter is a lineal descend-

TROTTING HORSE IN ACTION.

ant of the English thoroughbred. From the thoroughbred the courage and stamina of the Oriental blood are obtained, and from selected individuals the energy and speed of the racer, combined with a decided talent or instinct to acquire easily the trotting gait. The result

is the remarkable combination of qualities which has made the American trotter a possibility.

It is a pity that so much notoriety and scandal have become attached to horse-racing. The excitement incident upon a contest of speed and endurance between well-bred and well-trained animals is natural, and it is likely that love of excitement and sport has been honestly inherited by the human race. But how few are able to attend a horse-race, as conducted nowadays, and witness the exciting sport without adding to it the unnatural and debasing excitement of the betting ring. Too often the shouts of the multitude at a great race are due more to the exultation of the "winners" than to the plaudits of a sport-loving crowd given to the victor of a hard-fought contest.

This is not as it should be. Would that our race-courses could be rid of the obnoxious gambling features, for it has led many a promising man or woman to forsake a life of honest labor to gamble at "the track" in the hope of gaining wealth easily. It is far better to gain a modest competence by honest labor, than to acquire the greatest wealth at the expense of some one else without giving in return full value received.

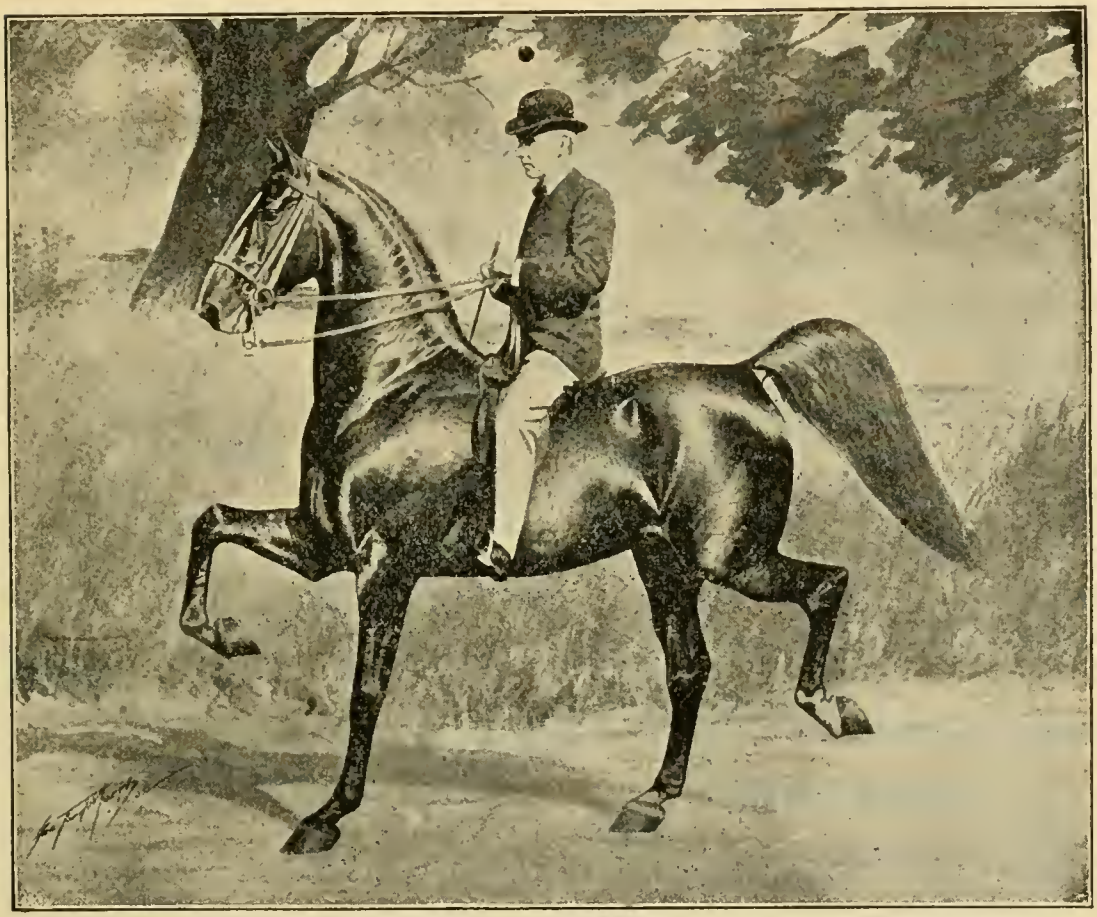
The Riding Horse

A riding horse ought to have a good proportion of the thoroughbred about it, but it should be thicker and stronger than the thoroughbred — up to more weight, as it is termed. The quarters ought to be long and powerful, the thighs muscular, the hocks clean and neatly shaped, the head clean and long, with a look of good breeding about it.

A riding horse cannot, as a rule, gallop as fast as a thoroughbred, but its other paces are better suited for giving pleasure in riding. It lifts its feet well off the ground with good all-round action. It can walk and trot faster and with greater safety than the thoroughbred. A good walk and trot are very essential in a riding horse, for a rider walks and trots his horse far more than he gallops it. In fact, no good rider who knows anything of, or cares anything for, his horse, unless absolutely obliged to do so, ever canters or gallops along the road or on a hard surface, because the jar of the hard surface tends to break the feet and cause all manner of mischief to arise in the legs, that in time may make the horse lame, or cause it to become what is termed unsound.

In selecting a riding horse, there are certain points which are very essential. It is necessary

to see where he will carry his saddle. The shoulders and withers ought so to place the saddle that the weight of the rider is thrown more on the quarters than on the front legs.



A RIDING HORSE.

In other words, when you are in the saddle, you ought to have a good deal of the horse in front of you. The reason for this is very plain. If your weight is well off the front legs, and on the powerful quarters, there is less chance of the horse stumbling and falling with you. And remember this, that it is the quarters, hind legs,

and hocks that are the propelling power of the horse, whether in walking, trotting, cantering, or galloping. The front legs simply direct the horse and keep him steady.

When you require a horse for carrying you on his back or for jumping, the quarters and hind

HORSE IN ACT OF LEAPING.

legs ought to be sufficiently powerful to enable the horse to do the work expected of him. If you watch a horse jumping, you will see that when he comes near the fence, he will prick his expressive and beautiful ears. This shows that he is thinking hard of how best he can

get over. When he gets within a few paces of the fence, he raises his front legs first, by his will gathers himself together, and then by means of his quarters, hind legs, and hocks, he gives the necessary impulse that carries his rider over the hedge, ditch, or gate.

You will note that the force or power that carries your horse over the fence is due to those quarters and wonderful hocks. If there were a slight weakness in one of those hocks, your horse would not have the strength to clear the jump, but very probably would catch his front legs in the hedge or rail, and fall on his head on the other side. He might thus break his own neck and yours into the bargain.

You can at once understand how important it is that a riding horse's hocks should be clean and strong, and the quarters muscular, well shaped, and powerful.

There is another important point in a riding horse. The pastern joints should be long and flexible. There is nothing more graceful to watch in the movements of a horse than the working of good riding pasterns. These pasterns ought to be long and flexible, not upright or directly over the foot, and the motion ought to be as easy as the springs of the most perfectly balanced arm-chair. It is the flexible and yielding action of these pasterns that gives ease and

comfort in riding. When you hear the expression, "Riding him was like sitting in an armchair," you may be quite sure that the horse of which that was said was well and gracefully made, with flexible, long, and yielding pasterns.

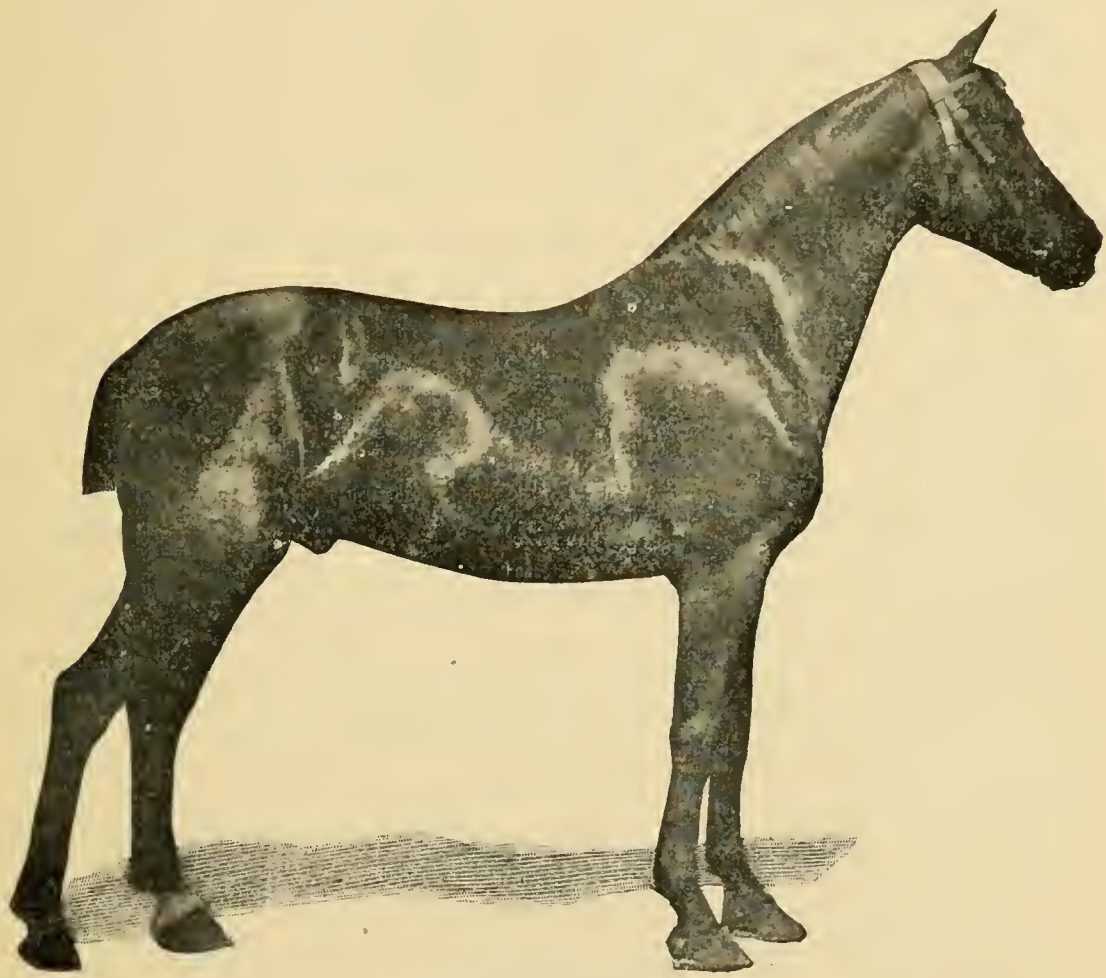
The pasterns of a draught horse are straight and directly above the foot, short, and with little give in them. The consequence of this formation is, that if you were to trot, canter, or gallop a draft horse, the motion would shake you "all to pieces," as the expression is, which of course means that the motion would shake you about so much as to be disagreeable, and you would find no pleasure in riding him.

A riding horse ought to be a good walker, a fast trotter, an easy canterer, and a fairly fast galloper.

The Carriage Horse

The carriage or coach horse should be a strong, well-bred animal. The horse that is used entirely for carriage work is required mostly for walking and trotting, and is seldom called upon to canter or gallop. So the carriage horse must walk at a good pace and be a fast trotter. To be a fast trotter he must lift his front legs well off the ground and throw them well forward, while the hind legs must come well under the body, with good and free hock action, in order

to give the pace and strength to draw along with ease the vehicle that is behind. Sometimes you may have seen a carriage horse with what is termed high-knee action. This means that the front legs come up and down almost straight, an



A GOOD COACHER.

action which of course does not carry the horse quickly over the ground; and moreover, the constant high up and down action, hammer, hammer, on the hard road, creates great concussion to the front legs, causing them soon to wear out. Besides, this high up and down action is not

natural to the horse; it has been artificially taught, and therefore is neither useful nor beautiful. But the moderately high action which throws the fore leg well to the front carries the horse over the ground at a good pace, and by lessening the concussion of the ground, enables a horse to last long and do much work.

If you notice a carriage horse going up a hill, you will see that almost all the power that he uses to drag his load comes from the hind legs and hocks; so you can at once understand how necessary it is that the quarters should be strong and muscular, and the hocks clean and without blemish. Watch the riding horse's pasterns move, as he walks by your side; watch when a carriage horse with his stout courage is doing his very best to drag a heavy load up a hill. Watch in both cases the hocks and hind legs do their work, and if you care for a horse and can admire the beautiful in form and action of the animals around you, you will reverence and wonder at what you see there.

As the carriage horse has not to carry a weight on his back, but to drag a weight behind him, his shoulders ought to be more upright, not so sloping as those of the riding horse; this enables the collar to fit the neck better, and so gives him more power to drag his load.

As horses have been bred for the purpose of

galloping fast, so horses have been bred for trotting fast, until the pace that some horses, especially the American horse, can trot is very swift. American trotting horses have been bred to trot as fast as many horses can gallop.

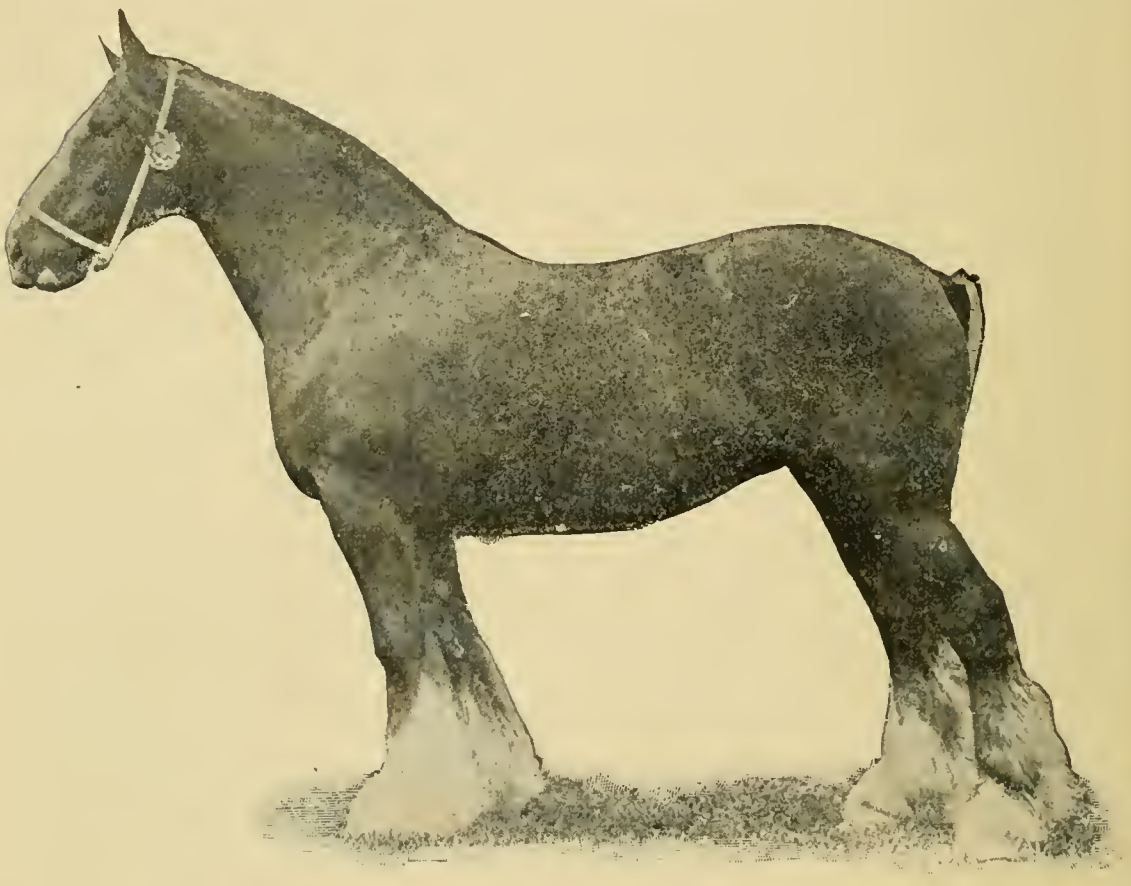
Don't forget that the first points to look for in all horses, whether for racing, hunting, driving, or dragging a heavy load, are first and foremost good sound feet and legs. Let these be unsound, the horse lame, or with a formation that will in time cause it to go lame if it works, and though otherwise it may be the best horse in the world it will be of no use to you.

Your horse must have a sound wind and perfect eyesight. It is said that imperfect eyesight is responsible for many horses "shying" at unfamiliar objects. The three principal points to look for when you are buying a horse are, therefore, clean, strong legs and feet, keen eyesight, and sound wind.

The Draught Horse

We now come to the horse that is especially the farmer's horse, and a beautiful creature have the farmers, by wise breeding and care, produced — powerful and beautiful outline of form, combined with great strength of body, gentleness of disposition, and a willingness to drag the heaviest load.

A seventeen-hand horse (a hand is four inches), dragging along two and one half tons of merchandise through our cities with ease and willingness, as if he enjoyed the effort, his coat smooth and



DRAUGHT HORSE.

glossy like satin, his brass harness trappings shining so that you can almost see your face in them, is indeed worthy of admiration.

Here we have a horse born and bred, not for pleasure, but for stern, hard work.

To carry manure to the fields, to gather our crops, to carry our food, our clothing, our coal and wood from place to place, so that we may all live more comfortable and happier lives: this

is the work this massive, noble, gentle beast is doing for us. Let us always treat him kindly, and think well of him, for he deserves it at our hands.

The shire or draught horse is not called upon to trot, canter, or gallop; his usual pace is walking. Therefore he ought to be a fast walker, and he must be so shaped that when he is doing his work he can walk freely and easily. You will very soon use him up if you walk him constantly at a pace faster than his form and strength will allow. When plowing or with a full load behind him, he ought to walk at about four miles per hour.

The draught horse should have a medium-sized head, and should be broad between the eyes, with neck fairly long and well arched. Its shoulders should be deep and strong, chest wide and full, back short and straight, ribs round and deep, hind quarters very powerful, long, and level, the feet wide and prominent at the heels, with bold, free action, and with clean, heavy, flat bone, and soft, silky hair. The long hair on the legs above the heels is called the feathers. These feathers ought to be silky. If a horse is coarse feathered, it is said to be a sign of coarse, soft bone. These feathers on the legs save the horse from chills, and this is very important when you consider the time he has to stand about in wet mud

and slush. None of us come to much harm if our feet and legs are warm; it is when these are cold and damp that we feel miserable and catch cold.

The Ponies

Under this heading we shall consider the smallest horses in existence. The word "Pony"

A SHETLAND PONY.

means a small horse. In the western portion of the United States, especially during the days of the pioneers, the horses in use were nearly all ponies, and they were always referred to as such. They were small riding horses, used by the Indians and cowboys. We never read of a cowboy or an Indian riding a horse — they

always call the animals they ride "ponies." Over a great portion of the West no other riding horse is known.

The smallest ponies are the Shetlands. They are, as their name indicates, natives of the Shetland Islands, north of Scotland. The climate of these islands is most severe, and the herbage is scarce and coarse. The hard life has consequently left its impress on this breed of horses. They are very small — from eight to eleven hands high — shaggy coated, with bushy manes and tails, and are extremely hardy.

These characteristics are what we should naturally expect to find developed under such hard conditions. Scanty, coarse food and a severe climate tend to produce smallness of stature and hardihood of disposition in animals.

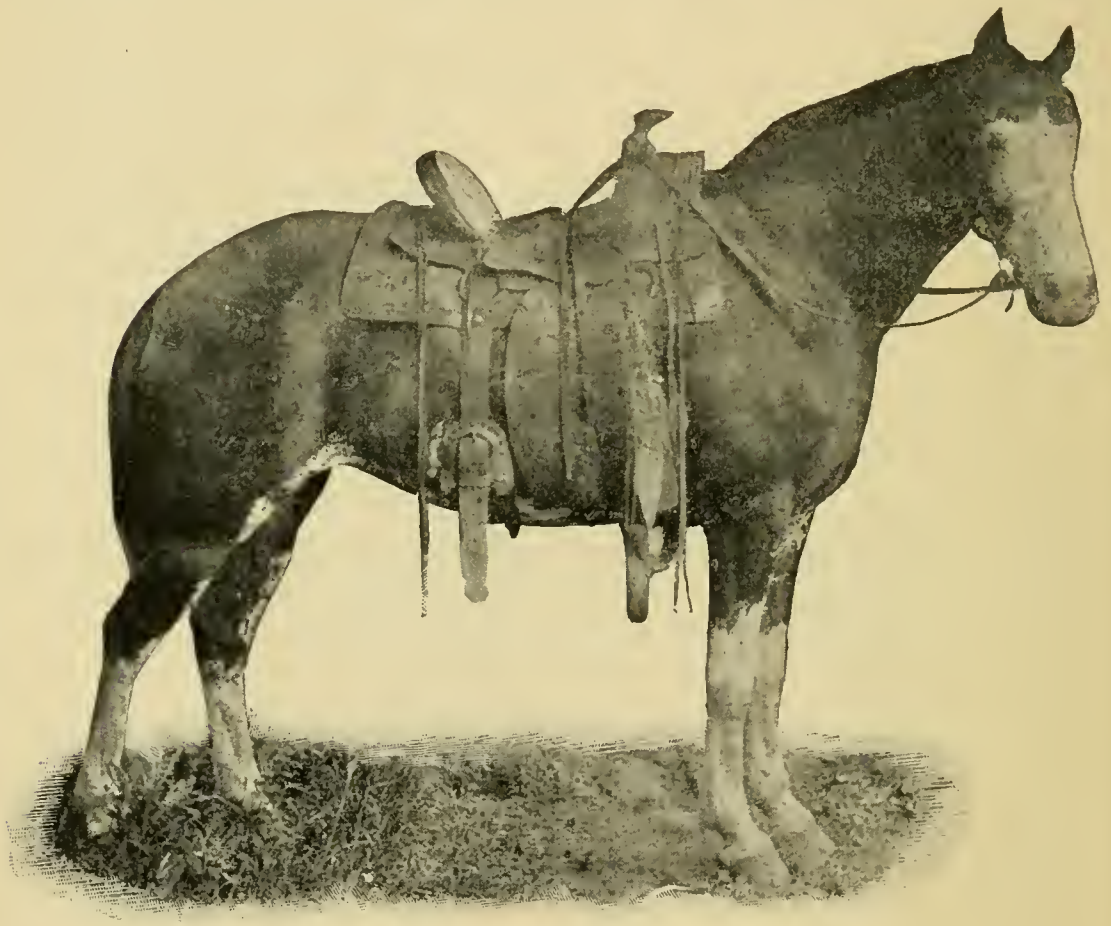
That adverse conditions are responsible for the diminutive size of the animals is well exemplified by the fact that the ponies of this breed, reared in our country, where conditions are more favorable, gradually increase in size.

This increase in size is not desired, as these ponies are used especially as children's horses; hence the smaller the individuals the more highly are they prized.

The Shetlands possess great muscular endurance, and are, as a rule, very gentle and docile. For this reason they are the safest and most

popular horses for children's use. They are withal very intelligent, and are thus easily trained.

Our account of horses in our country would not be complete without a few words about the



A BRONCO.

Mexican or Indian Ponies of the West. These are the wild horses of the plains, and they had their origin in the Spanish ponies introduced into Mexico by the Spaniards in the sixteenth century. From Mexico they spread gradually northward into Texas, New Mexico, and Arizona, and are supposed also to have formed, with the

French Canadian ponies, the breeds used by the more northerly tribes of Indians.

In Texas, these ponies are called *Mustangs;* farther north they are more familiarly known as *Broncos.* Both these names have become synonyms of all that is bad and vicious in horse-flesh. These horses are notorious as the most ill-tempered and unmanageable beasts that man has to deal with.

Yet they are tough, wiry, and possessed of the most remarkable endurance. Though small (they stand twelve to thirteen or fourteen hands high, and weigh from 600 to 800 pounds), these ponies will carry heavy men on their backs and make a pace and distance day after day, under most adverse conditions, which would put to shame some of the most highly bred horses.

Pony Express

In the early days of the Far West, before the overland railroad was built across the plains, a "pony express" was run from the frontier settlements to the far western country. This express carried letters and light parcels, and consisted of relays of riders and ponies. The wild native ponies were used on these perilous trips, and many a daring rider was enabled to escape with his life only by the fleetness and remarkable endurance of his pony. Bands of murderous

Indians roamed over the country, trying in every possible way to stop the advance of the white settlers, and naturally the pony express riders were the special object of their villainous attentions.

The vicious tempers of these horses have formed the subject of much that has been written about horses. It is likely, though, that the accounts of their unmanageableness are very much overdrawn. In fact, young pony colts taken when about two years old, and given the same care and attention in their breaking and training as is given to highly bred animals, have shown dispositions quite unlike the unruly viciousness with which they have been credited. Naturally there are individuals among them which are mean and vicious; but this occurs also among the best breeds. Kindness and firmness — not cruelty — in the breaking and training of horses of all kinds will always accomplish the best results.

How to stable a Horse

The stable should be airy, ventilated from the top, well lighted, and free from offensive smells. The drains should discharge outside the stable into what is termed a covered trap. Above everything, there should be no draughts in a stable, as there is nothing so likely to give a

horse a bad cold as a draught. In fact a draught is bad for everything that grows and lives, — man, animals, and plants.

It is well known that a horse seldom or never catches cold in the open fields, even if he is kept

A MODEL MODERN STABLE.

out through the severest winter, provided, of course, he can get sufficient heat-giving food. If a horse's coat stands up, and his ears feel cold to the hand, you may be sure that the horse feels cold, and requires warmth.

Remember that a horse is naturally intended to walk or roam about plains or fields. So when he feels chilly he simply moves about. When

he is in a stall he cannot do this, and therefore he has no means of keeping up his circulation.

A horse will require less food in a warm than in a cold, draughty stable; it is better, however, to have a cold stable and plenty of air than a warm stable and foul air.

The stable should be well lighted, because this keeps the eyesight keen and good, so that a horse that is kept in a well-lighted stable is not apt to shy when he is at work.

The stable should be free from offensive smells, because bad smells and defective ventilation cause a horse to feel unwell, and then he becomes low-spirited and out of condition. Whenever a horse that is usually a good feeder refuses his food, you may be quite sure that there is something wrong with him.

The bedding should be sorted and the wet portion removed every morning. The stable should be frequently flushed out with a plentiful supply of fresh water.

Grooming and Feeding

To keep a horse in good health and in the best condition for working, his skin should be well rubbed over every morning with a hard, stiff brush and currycomb. When a horse is out in the open, he will often roll on the hard, uneven

ground, and thus set up a healthy friction of the skin which is so necessary to health. He cannot do this in a stall, so we are obliged to use a hard brush and currycomb. This helps to keep the skin clean and free from scurf, stimulates circulation and creates warmth.

The feet ought to be carefully washed and cleaned out every day, and your horse must never by any chance when he is in the stable stand in damp slush or muck. If he does, he will soon get something wrong with his feet and in time go lame.

A horse ought to be regularly fed; the number of times a day and the quantity of food depend on each horse, and the amount of work he has to do. Remember that a horse has a small stomach, and therefore he ought to be fed in small quantities and often; especially is it important that he should be fed early in the morning.

As a rule, the best "feed" for a horse when he is at work is good, clean, sound, old oats. Oats have a high feeding value because they contain a large proportion of flesh or muscle-forming material, which is naturally very desirable for work horses. We should not feed our horses on grain which will make them fat at the expense of good, sound muscle. Care on this point should be especially exercised in summer.

Fattening food is heating food, and a fat horse, like a fat man, is not able to work hard without soon tiring. In the colder portions of our country, and in winter, more fattening food is allowable. It is even desirable or necessary where the stable is not kept warmed during the coldest weather, or where, as is often the case, the horse has little or no protection during winter. As mentioned above, a horse will be able to withstand very cold weather if he has a sufficient supply of heating or fattening food.

Of course, what we have said about "feed" refers to the concentrated part of a horse's diet and is in addition to the rougher portion — "roughage" as it is called — hay or grass. Oats, corn, barley, or other grains are to the horse what meat is to man, a highly concentrated food which needs rougher food to go with it. Hay or grass performs the same functions in a horse's diet that potatoes and other "vegetables" do in man's.

It is a good plan to crush the oats or other grain, and then mix them with finely chopped hay, straw, or chaff. Then the whole mass should be moistened with water. This will make an appetizing and digestible meal.

If the grains be fed whole and not mixed with hay or chaff, a horse will swallow much of them without properly masticating them, and thus he

cannot fully digest them. Therefore many of the nourishing properties of the food are lost; that is, are not turned into flesh, muscle, and bone, and this of course means waste and expensive feeding.

Whereas, if the grains are crushed and mixed with rougher material, the horse is obliged to chew them all well together. This causes the saliva to mix freely with the food, and promotes digestion.

It is not what you swallow that of necessity does you good, but what you digest. It is much better for the health and strength of your animals, and for your own well-being, to take a small quantity of well-digested food than a larger quantity of badly digested food.

You make a horse comfortable for the night by "bedding down," as it is termed — that is, you pile up around him and under him a good thickness of clean straw upon which to lie. After you have done this, give him a good armful of sweet, clean hay. The best hay has always a strong, sweet smell, and has a greenish look. When hay looks dark brown, it shows that it has not been harvested in the best condition; in other words, that much good feeding quality has left it, and that there is very little nourishment in it.

Horses are very particular about the water

they drink; therefore, let it be pure and wholesome, and see that the bucket in which you carry it is quite clean. Soft water is the best. It is more easily digested, and not so likely to chill a horse. It has been found that if water is always left in the stable, where the horse can drink it when he likes, he will drink less than when it is given him only at stated times from a bucket.

When you are driving a horse on a journey, and you come to a drinking fountain, let him have a few mouthfuls; it will refresh him greatly, especially on a hot day.

Experience has taught us that it is best to give a horse a little water before he feeds, and never wait until *some time after* he has finished his feed. In the summer some good green grass or clover should be given; this cools the blood and affords a change of diet. A carrot or turnip sliced up and mixed with the "feed" is very refreshing to a horse. Most horses are very fond of sugar. When they are fond of it, give them a few lumps each morning from the palm of your hand; then, as the delicate, sensitive lips take the sugar, speak to your horse, and he will soon get to know your voice. Thus you may train him to obey your will.

Wherever possible, give your horse a few weeks' run in the fields every year. This will

add to his general health, strengthen his legs, and extend the number of years he will work for you. Just as human beings need a vacation, or period of rest, so does the hard-working horse require a chance to recuperate from his yearly toil.

How to treat a Horse

There is a golden rule, "Be firm, but kind." If possible, never change your mind. Let a particular word and tone of voice always mean that you intend a horse to do a certain thing, and see that you are obeyed. If possible, never let a horse conquer you, because you will have more trouble next time. A horse soon learns who is master.

If your voice, rein, and heel fail to obtain obedience, then as a last resource use the whip. When you do use the whip, use it well, but only when everything else has failed; and always remember this, for it is very important — keep your self-control; don't lose your temper. In your treatment of all animals be very patient, and closely observe the different dispositions of each.

Perhaps there is nothing that shows a good horseman more than his manner of holding and using the whip. A skillful plowman — and very skillful work is plowing — will work his team by his voice, with only the assistance of two slender string reins.

A good teamster will seldom strike his horse. Why should he, when the big, beautiful creature understands and obeys everything said to him?

The human voice, when it is associated with confidence and affection, has a wonderfully calming effect on a horse. It will succeed when everything else fails. Therefore constantly talk to your horse. Before going up to him in his stable always speak to him. While you are speaking to him, stroke his neck and nose gently. Associate everything you do with some word or tone of voice, and in a short time your horse will understand what you mean. He will then regard you as a friend, and the kinder and more considerate and feeling you are, the more work he will do for you, and the greater the pleasure you will have in working him.

Many horses shy a good deal at objects they meet on the road. This usually arises from nervousness, because the objects are not familiar to them. Therefore, to cure the habit, you must get your horse accustomed to what he sees, and so give him confidence.

If your horse pricks his ears, and shies at something he sees on the road, take him up to the object he has shied at; at the same time speak firmly but soothingly to him; this will soon give him confidence.

Of course some horses will shy and jump

about, all over the road, out of pure high spirits and from want of work. The only thing then is to sit steadily, using your voice and judgment, till the high spirits have expended themselves.

Be careful never to stop a horse that is drawing a vehicle or load in the middle of a hill, except for a rest; and if for a rest, drive him across the hill and place a big stone behind the wheel, so that the strain on the shoulder may be eased. Unless absolutely necessary never stop a horse on a hill or in a rut, so that when he starts again it means a heavy tug. Many a horse has been made to jib or balk and has had his temper spoiled by the driver's not observing this rule.

Above all things, be careful of your horse's mouth. In riding or driving you ought only just to feel your horse's mouth. Your hands ought not to be rigid, like bars of iron, but they ought to give and take with every movement of the horse's head. Your horse's mouth then becomes delicate, alive, not hard and dead. In short, try to cultivate what is termed light hands. Then if sympathy exists between you and your horse, you can guide him with hardly any movement of the reins or hands.

If your horse has what is termed a "good mouth," he is much more valuable, because a good horseman gets so much more pleasure in riding or driving him. It is misery to handle

a horse that is always pulling at you, with a mouth that feels dead. It is something like pulling against a stone wall. Such a horse loses half its value. These hard mouths, and, indeed, many evil habits are often caused by the heavy hand and rough methods of ignorant men in "breaking in" young horses. In nine cases out of ten the manners of a horse depend on the way he is treated when young.

To secure good manners in a horse, which means that he does not shy, kick, bite, run away, balk, or jib, but moves along easily and brightly, answering to every movement of the rein and whip, and command of the voice, he must from the time he is born be treated kindly, but firmly, and never frightened.

Remember that a horse is naturally a very timid and sensitive creature, and therefore, when you break him to work, try to create in him confidence; but at the same time make him feel that he has to do what he is told.

The colt before it has left its mother ought to be handled, petted, spoken to, and made accustomed to the saddle, bridle, and harness.

If you wish the young horse to become a first-class and clever jumper, make some hurdles in the field, over which he will be obliged to leap before he gets his water and feed of grain.

It is a great mistake to work your horse much

when he is young. He ought only to do very light work between the ages of four and five years. By the time he is five, he has probably stopped growing; his bones are set and hard, and his muscles strong and flexible. The year spared to him between the age of four and five will probably enable him to work for many years longer than he could do if put to hard work before that time.

You have noticed how fond horses are of companions. How sociable they are. With some horses this sentiment is so strong that, if their stable companion be taken from them, they will fret, and for a time refuse to feed. If the companion that has been with a horse in the field be taken away, the solitary one that is left will gallop wildly about, neigh, and show every sign of unhappiness.

A Few Facts about All Horses

A horse is a grazing animal; therefore if he be symmetrically made, he ought to be able to reach the ground with his mouth without being obliged to bend his fore legs. If you see a horse bending one of his fore legs while grazing, you may be sure that his neck is too short — out of proportion to the rest of his body. If this be so, the constant bending of one leg, while grazing, to enable the mouth to reach the ground,

tends to weaken the fore legs. In buying a horse, then, it will be well to observe this point, for it must not be forgotten that an unsound horse is an expensive animal at any price. One of the chief points of soundness in a horse is that he have strong, firm, hard, erect front legs if he is to last and do constant work.

The teeth at the back of a horse's mouth are called grinders, the teeth in front are called cutting teeth or incisors. A cow has no front upper teeth, but only bare, hard flesh — a pad, as it is called. She therefore, with her tongue, gathers off the grass, which is at once sent to one of the four compartments of her stomach. When this is full she generally lies down and pumps the undigested food into her mouth, and then by moving the jaws from side to side, her back teeth, or grinders, grind the food very much as corn is ground between the rough edges of the "mill stones" of a mill. When the food is thoroughly masticated in this way, it goes into another compartment of her stomach, where it is digested in the usual manner. Now, a horse cuts the grass off with his front incisor teeth, very close to the ground, masticates it, and swallows it as we do our food. A horse has no pad, as a cow, but six sharp cutting teeth in front, so that he can graze very much closer to the ground than can a cow.

Here is another important fact. Between the six incisor front teeth and the back teeth or grinders, the horse has a space called the bar, into which fits the bit that is placed in his mouth. If a horse had no such space as that, but teeth all round the jaws as we have, it would be a great cruelty, in fact it would be impossible, to place a bit in his mouth.

The Use of a Long Tail

On the open, hot, and dry plains, where the wild horses of many hundreds of years ago wandered without interruption, there were myriads of tormenting flies. Their sting and irritation is maddening to most horses. As a means of defense and in order to drive these tormenting insects away, the horse has been provided with a long dock to which is attached a long wisp of coarse hair. With this long tail the horse is enabled to switch off the flies from most parts of his body. He dislodges the insects from his shoulders and fore legs by being able to give a quivering motion to the skin of the front portion of his body.

On very hot days the flies are especially troublesome. If you have ever observed horses in the open fields or pasture, you must have noticed two horses standing closely together head to tail. If you will watch them closely

you will see that they are actually knocking the flies off each other with their long tails. This is one illustration out of a number, which might be mentioned, in which animals give each other mutual help.

You must have noticed, on our city streets or in our parks, horses with their tails "docked," that is, cut off close to the body, so that they can no longer serve any useful purpose. Perhaps some may wonder why this has been done.

The custom was started in England in order to prevent the horse getting his tail over the reins. This greatly annoys some horses, and when they feel the reins under the tail, they will begin to kick in a dangerous manner. With a rein under the horse's tail, the driver is almost powerless, and in crowded places this might result in a very dangerous accident. This led to the practice of docking or cutting off the tail when the horse was young.

In England, where the weather is often cold, cloudy, and damp, there are only three months of the year (July, August, and September) during which the flies are at all troublesome. But in most parts of America, where flies are more numerous and troublesome, it is really cruel to dock a horse's tail, and thus deprive him of his means of driving off his tormentors.

Out in the Field

When you first turn a horse out into the fields, or let him loose in some wide inclosure, after he has been a long time confined in a stable, you will frequently see him put down his head and throw his heels high into the air — kicking, galloping, and squealing to show his great delight at being free.

Sometimes, after he has galloped about, he may stand for a moment and with tail and head in the air snort loudly, showing the beautiful red inside the sensitive and quivering nostrils. The eye is alive and bright, and full of spirit and hope. Liberty seems to have transformed the animal into a creature of strong beauty and activity. It is then that you must watch him if you want to see him at his best. Then, as if suddenly remembering that he is at liberty, away he will go again, until some of his excitement has worn down. He may then lie down and try to roll over. This he may do two or three times. It is thought the horse rolls on the ground in order to set up a healthy friction of the skin. We know that this friction is necessary to keep the horse in good health; therefore as he cannot roll while confined in the stable, we must curry and brush him every day.

When a horse gets up from the ground he

places his front legs well forward, and with them starts to lift his body; then using his hind legs, with a great muscular effort he hoists himself on his four legs. You can see at once that this is the wisest way for a horse to get up if he is to get quickly into his stride and gallop off, when pursued by his wild enemies.

You may have noticed that a cow, in getting up, rises first on her hind legs and then slowly lifts herself on her front legs. As a cow's weapons of defense are her horns and neck, you will easily see that this method of getting up is wisest in her case. She can in this way keep her eyes fixed on any beast of prey which may be approaching to attack her. A horse's weapons of defense, on the contrary, are his heels, and the quicker he can get up and into his stride, the better chance he has for escape.

You will remember that at the beginning of this chapter you read that before horses were tamed by man they wandered in large herds over wide and immense plains. Now this statement is borne out by observing the habits of your horses, especially of the young horse, — the foal.

If horses lived in herds on wide plains, their principal weapons of defense and of escape from their enemies must have been their great pace

and endurance in traveling. If therefore the young foal, almost as soon as it was born, could not have galloped fast, the enemies of the wild horse would soon have captured and killed all the young foals, and so it would not have taken very long before the race of horses would have come to an end.

To give the colt the speed that was necessary to preserve its life, it is provided from birth with very long legs, making it look like a horse on stilts. And, if you observe a colt, you will see that within a few days of its birth it can gallop almost as fast as it ever can in its life.

There is a story told of a thoroughbred foal of about a month old, that once beat a trained race-horse over a half-mile course, and thus won its owner a large sum of money.

The mother or dam of the foal was noted for her speed, and although she had a jockey on her back, she beat the horse racing against her, and her long-legged foal kept up with her with ease.

Now, if the young foal had had a large stomach and had been obliged to consume a large quantity of food to satisfy its hunger, as does a cow, it could not have galloped fast, and so would easily have been captured by its enemies. Because the foal has a small stomach it needs constantly to go to its mother for food, and is satisfied with a few mouthfuls at a time.

Then look at the hard, round hoof of the horse: how beautifully suited it is for traveling fast on hard plains. If a horse gets into a very boggy place, its hoofs sink in, acting as a kind of sucker, so that it requires a strong, muscular effort on the part of the horse to pull them out. Now, a cow or an ox, owing to its having a slit between its two toes, can travel faster over a place deep in mud than can a horse. It is stated that owing to this fact mounted hunters have been overtaken and killed by fierce and enraged wild buffaloes.

Also notice how a young foal will lie down. It will stretch itself fully out. A calf, on the other hand, will curl itself round in as small a space as possible. You will read the reason for this in the chapter on the cow.

In the open plains there was little or no cover for concealment, nor was there any need for a herd of wild horses to conceal themselves. They trusted to escape their enemies by their speed and quick senses of hearing and eyesight; they did not trust to concealment, as did the cow.

When a horse is alarmed it throws its head as high in the air as possible, as if desirous of obtaining the most extended compass of view. This is what it would naturally do on the open plains, for the farther away it could see its

enemies approaching the longer notice it would get, and the better would be its chance of escape.

Such actions as bucking, kicking, and shying go back to the time when the horse lived in wild state. We have already described the actions of horses when they are first turned out in the fields after confinement for some time in a stable. We have seen how they will gallop about, and with heads well down will kick and buck. You can at once understand that this would be the best plan for a horse to adopt to get rid of a beast of prey that had sprung upon its back. With some horses, the power of kicking and bucking is so great that they can get a saddle off their backs without breaking the girths.

Let us suppose a herd of wild horses trotting over a plain. They came across a thick mass of growing grass in which lay concealed a beast of prey. Directly they saw the slightest movement of the grass, their experience taught them to suspect that some beast of prey was on the move, and was about to spring. Then the horses that could swerve the quickest and farthest would have the best chance of evading the spring of the beast that hungered for its dinner.

These and many more habits that we observe in our domestic animals seem quite useless now, but you may be sure they were of the greatest

use in preserving the lives of their wild ancestors before they were tamed by man.

The intense desire to live, which is present with everything that does live, caused these habits to be gradually acquired or adopted by the wild ancestors of the present animals; and these habits, continuing for countless years when they were in the wild state, became at last so firmly rooted — instinctive, as it is called — that they continue in the domesticated animals of to-day, of course to a very much slighter extent, although their need, for the purpose of preserving life, no longer exists.

In the country it is most important to observe carefully everything that goes on around you, and then to try to remember accurately what you have observed. In this way you will probably learn more of the life about you than you would from any number of teachers and books, no matter how good they are.

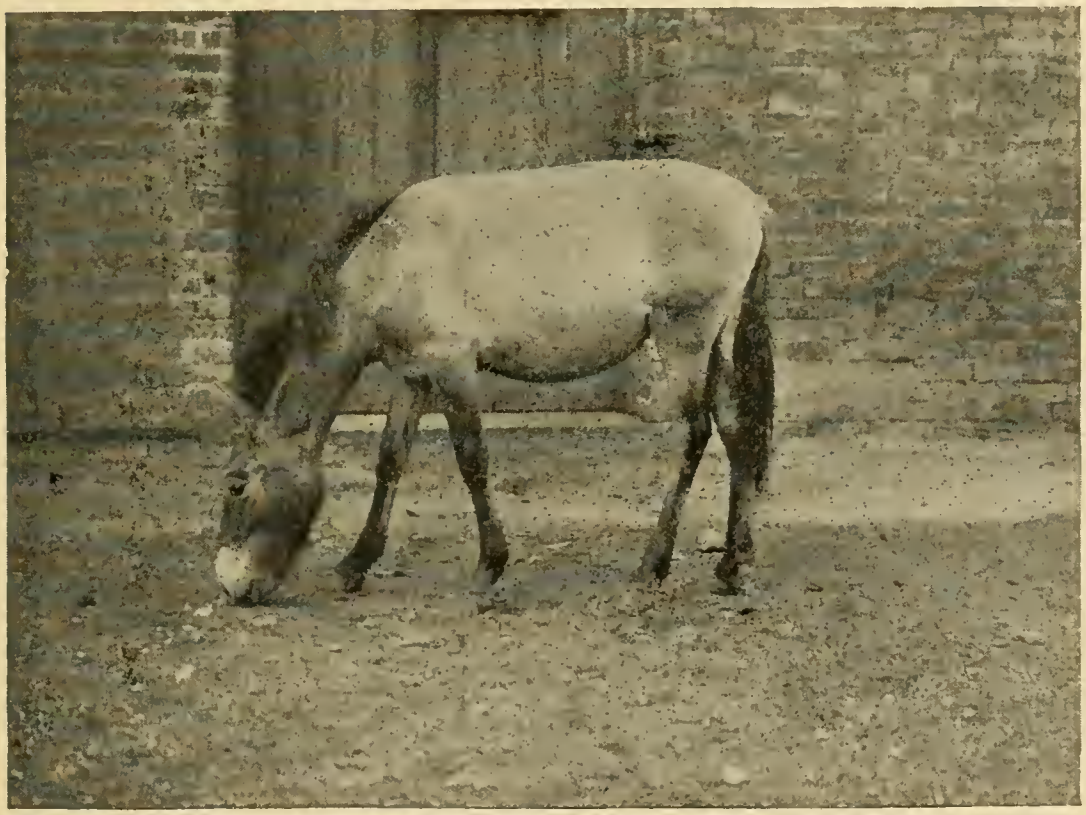
Just as each of us has a different disposition or character, so each animal has its particular character or disposition. And the more you treat each animal according to its own disposition the greater will be your power over that animal.

CHAPTER II

THE DONKEY

Extinct Ancestors

As we have seen, the prehistoric ancestor of the present-day horse has been given the name



WILD HORSE CAPTURED IN CENTRAL ASIA.

"Hipparion" by those who have studied the fossilized remains. This extinct animal moved about on one toe on each foot, as our horses do; but it had two other toes which hung uselessly at the side of the useful middle toe.

From the appearance of the wild horses and wild asses found living to-day, and from other evidences, the Hipparion wild horses are thought to have resembled asses rather than horses.

The wild horses that have lately been captured in Central Asia, and which are now to be seen in the great Zoölogical Gardens of London, have certainly some of the characteristics of the ass, — the feet, nostrils, tail, the stripe down the back. They are said to be the first genuine wild horses that have ever been captured. The *so-called* wild horses captured previously to these, are now said to have been horses that at one time were domesticated, which, escaping from captivity, had reverted back to their wild condition.

Interesting as these speculations are, we cannot go further into them, but must confine ourselves to the living animals found to-day.

The wild ass wanders to-day over the arid or dry and parched regions of Asia, ranging from Syria to Persia and western India, and northward over a large extent of Asia. In Persia he is rated a noble game animal, and his flesh is as highly prized as venison is with us.

There are three varieties of these Asiatic wild asses, some varieties being larger than others. They stand about three feet eight inches to four feet high — eleven to twelve hands, at the withers.

Some specimens which have been brought to the London Gardens are whitish brown in color, with smooth coats. They are alert animals and are slender but strongly built, with good, hard bone.

In their native countries they travel over great desert plains and stony ground, and when pressed they travel at a great pace, and with a remarkable security of foothold. They live mostly in small bands of two to four or five, sometimes in herds of twenty to thirty.

They feed, and keep in hard condition, on the dry, wiry grasses, the only growth of those arid regions.

Like many of the fleeter animals that live where vegetation is scarce, they are often obliged to wander for long distances in search of food.

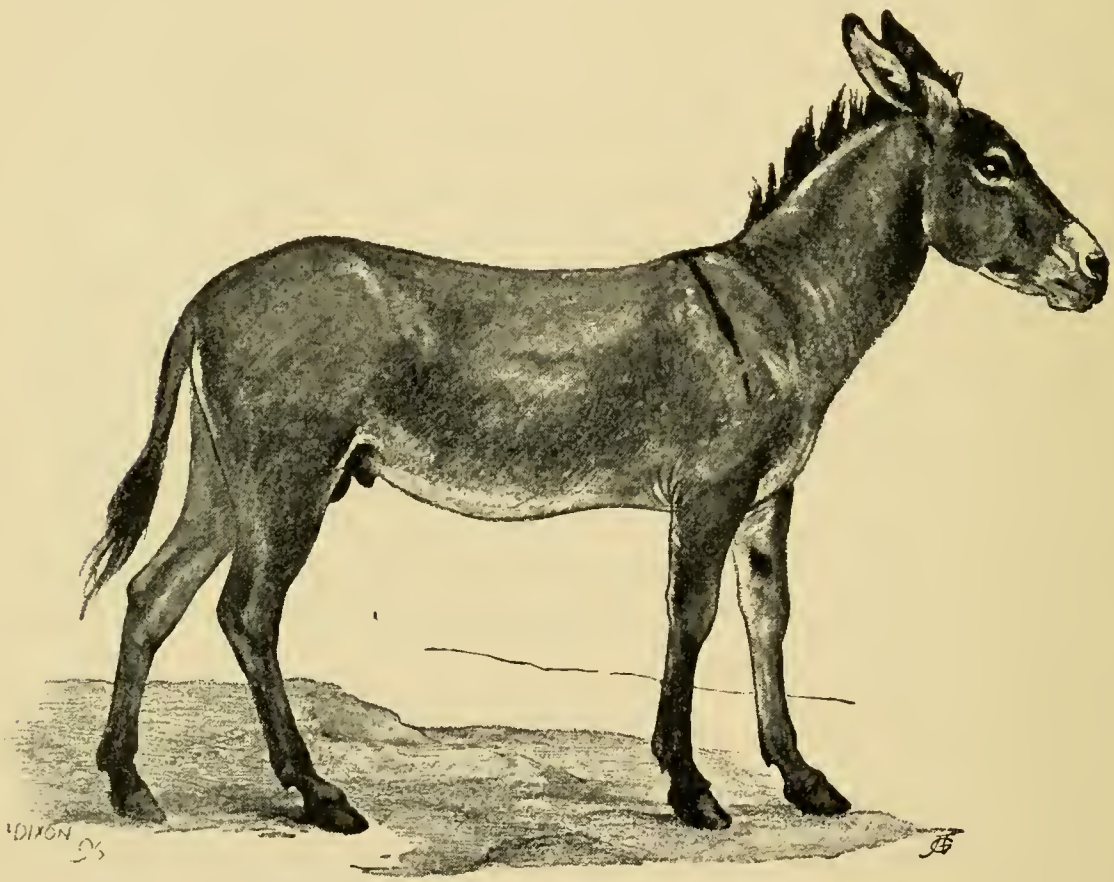
This migration in search of food may be one reason for the remarkable endurance of the modern horse and ass.

The natural pace of these animals in the wild state, when traveling, is said to be a trot; hence the ease with which the domesticated breed can keep up this pace for long distances.

The African wild ass has perhaps the most interest for us, because our domestic breeds are said to have descended from it. There is certainly a very close similarity between the two, and their bray cannot be distinguished one from the other.

The ass was domesticated by the Egyptians before the horse, and was used as a servant by that wonderful people in the valley of the Nile. From thence it was taken into Europe by the Romans.

In the desert regions of Africa, in the mountainous tableland to the south and east of Egypt,



THE AFRICAN WILD ASS

and in Somaliland the ass is found wild to-day. It has much larger ears, a shorter mane and tail, and a thicker coat than the wild Asiatic species.

Travelers who have seen the African ass wandering at large tell us that in its native

haunts it is the perfection of activity and courage; that as it travels with the speed of the horse over the rocks and sands of its native country, it carries itself well with an all-round free action.

It is very difficult to approach, and it keeps fat and in good condition on the wiry and scanty herbage that it finds about.

The color of these wild animals matches so wonderfully with the rocks and sands about which they wander, that it is at times very difficult to see them. This "protective coloration," as it is termed, often must have saved a wild ass's life.

During the long past, the chance of living and rearing offspring was limited to those whose color was such as would help to conceal them, as well as to those who by their keen eyesight, quick hearing, and general alertness could detect an enemy approaching, and then, by hard stamina and quick pace, could make good their escape.

In order to understand how certain characteristics of these remarkable animals became fixed, it is important to try to realize the following facts: —

Their wild ancestors must have wandered at will over extensive tracts of uncultivated and diversified country, ages before they were pressed into service by man.

During this long period, if they were to survive, they had to acquire certain characteristics, physical and mental, which were the most suitable to the wild life they had to lead.

They had to wander long distances in search of their scanty food; they had to rear their foals in safety. They had to guard against the crafty, stealthy stalking and hunting of their ever vigilant enemies, the beasts of prey. They had to keep sound and in good condition, in different degrees of climate, and on very scanty fare.

To perform and to survive all this, certain mental and physical characteristics had to be acquired, and then further, by constant habit, to become fixed or instinctive.

The characteristics needed were alertness, speed, and endurance, and in the case of the horse, mutual self-help, together with the essential characteristic of being able to keep in sound, hard condition, amidst constant changes of climate, and on dry, wiry, scanty food.

To obtain that wonderful eye, that keen hearing, that well-knit frame, that straight whipcord kind of leg: what lives it must have cost!

We must believe that it cost the lives of numberless animals, and that the experience and inheritance of many generations of survivors were necessary to fix the essentials of self-preserva-

tion; but at last so firmly fixed did they become, that man by his domestication has altered or modified them but little.

To take the wild traits as our ancestors found them, and then to develop them along their natural lines, so that they might be of the greatest service, was the wisest plan. This plan man has adopted; hence the great use these animals are to him.

Horse and Ass Compared

Now notice these points about the donkey, and then reflect if they do not incline one to believe that the wild donkey lived in more mountainous regions than the wild horse.

A donkey is very sure-footed and, if he chooses, can climb up and down hillsides with as sure a foothold as that of a cat.

A man may ride on a donkey so small that his (the man's) legs will almost touch the ground. Yet the little animal will carry him up and down almost perpendicular mountain sides with marvelous sure-footedness.

The legs of the donkey are very similar to those of the Bighorn chamois, and other climbing animals. They are strong and sinewy like whipcord. A donkey's foot is more pointed than that of a horse, similar in shape to those of other hoofed animals that live in mountainous

regions. In consequence of the mountain life of its wild ancestors, our modern donkey has excellent nerves and is not given to shying, or being seized with panic; it never loses its head on the most perilous mountain trail, which cannot be said of the horse.

Horses that come from a very open country, such as the Arab and Barb horses, are not nearly so addicted to shying as those that live where, here and there, are scattered clumps of bushes and trees, which might harbor an enemy.

Now, for long ages, the wild ancestors of the donkey lived where there was comparatively little danger of its enemies lying in ambush. This may account for his steady disposition, and for the fact that he is not inclined to shy. But although he had not much fear of foes lying in ambush, he was always on the alert against the wary approach and clever stalking of enemies, which the projecting crags could so easily conceal. The clever beast of prey would creep and pause, and lie still, taking advantage of every bit of cover, until it crept within the distance needful for a successful spring. Therefore the importance of a donkey's having large ears to catch quickly and readily any sound that might be made by his approaching enemy.

The ass is gray in color with a black band down the back, a most suitable coloration for

concealing a wild animal from its enemies. The gray tint would exactly match with the grayness of the mountain and its surroundings, and so he would have a better chance of escaping notice, than if he were of a color that would stand out clear and distinct against the rocks, hills, and sandy-colored soil that everywhere surrounded him.

A donkey's coat is more shaggy than that of a horse. This suggests that the wild ancestor lived in elevated regions where the air was cold. At the same time a donkey can bear heat well. This again suggests that his original wild home was amidst the mountainous regions of the tropics, where he was subject to variations of temperature, sometimes cold, sometimes hot.

The eyes of a donkey are said not to be so quick as are those of a horse, nor does he so often turn his head about to sniff the air.

On sandy or grassy plains where the wild horse wandered, steps are deadened, and therefore eyes are more valuable than ears, to give warning of any approaching enemy; and the breeze blowing evenly across the plain reveals to the horse, if he be standing to leeward, the approach of the enemy before it comes in sight.

Another natural trait observed in the ass is its inveterate dislike to crossing water. With some asses this is so strong that no coaxing or bribing will get them over.

How is this to be accounted for, except that the wild ancestors lived in districts where they had little or no experience of water?

Another trait — he has a great liking for thistles, and his mouth is so made that the prick of a thistle has no effect upon it. The fact proves that the wild asses must have lived in regions where the thistle family of plants abounded.

The Stubbornness of an Ass. — A Suggestion

The stubbornness of the ass is proverbial. We often hear the remark "as stubborn as a mule." It is interesting to conjecture how the animal acquired his stubborn traits. We say "conjecture"; we cannot do more than this, because we have no absolute facts upon which to base any accurate conclusion. The only fact which exists is the fact that the ass is stubborn.

We have seen that the wild asses do not live in large herds as do the wild horses.

In mountainous places where food is scanty, only a few wild asses could live together; while, on the other hand, wild horses who lived in more level districts, where food was more plentiful, could herd together in greater numbers.

Horses are, therefore, particularly fond of

being together; they perhaps are the most sociable of all our animals, but not so the ass.

Should a foe appear, each must decide for itself how best to escape, no following the leader and making good an escape in that manner. May not this have developed a stubborn self-reliance?

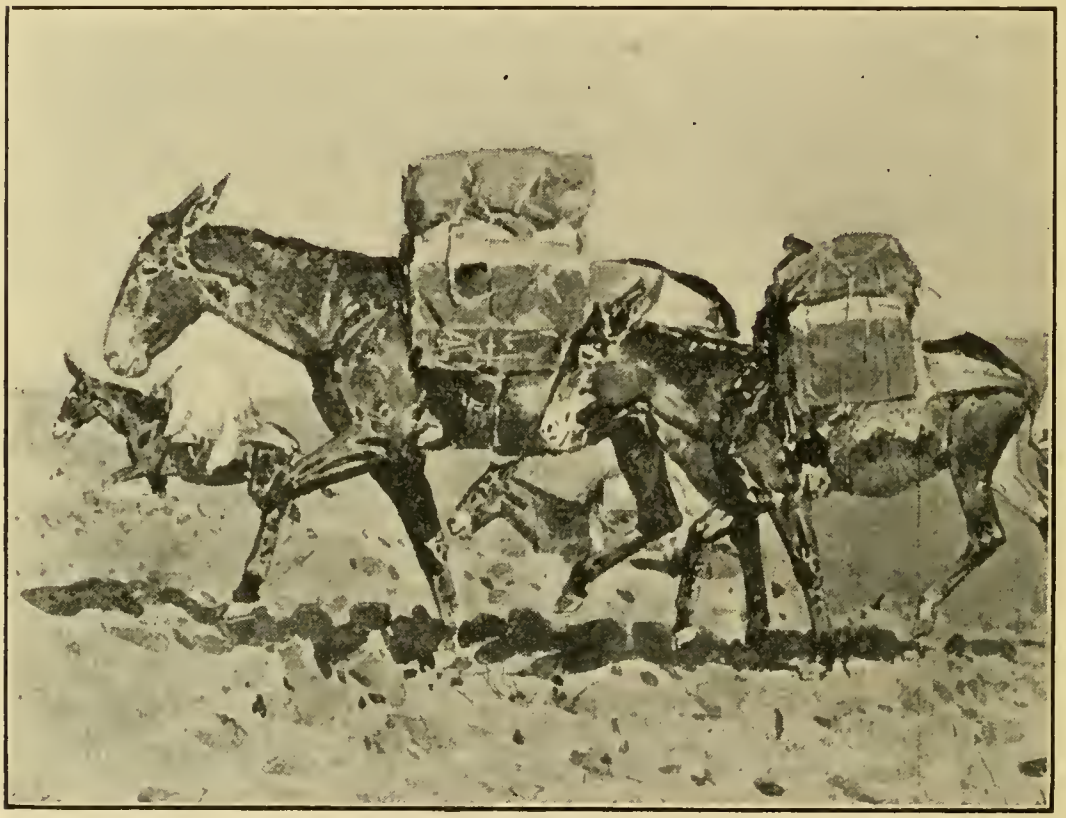
You must have noticed that people who live somewhat isolated lives are more stubborn, more self-reliant, less quick to act than people who live in communities, who act together, and ask advice of each other.

In common usage the terms *ass* and *donkey* are used indiscriminately whether speaking of the large, well-developed animals which are used wholly for breeding purposes or of the small animals which are used as draught or pack animals. The word *donkey* more correctly refers to the latter, and they are used as both carriers and draught animals in the western mountains and plains of the United States, and also to some extent for children's riding animals, much the same as Shetland ponies are used.

In our Western States they are known as "burros," a name undoubtedly of Spanish origin. The burro breed is presumably descended from stock originally brought in by the Spanish settlers of our western country.

The burro, or donkey, played an important

part in the settlement of the Far West. These little animals were of special value in mountainous districts both on account of their sure-footedness, and their great carrying power. In fact, even to the present day, they are used in



BURROS.

the mountains and upon the deserts, by prospectors and travelers. They are almost invariably used as "pack" animals; that is to say, they are used to carry loads on their backs. They will carry over the mountains a pack weighing more than a horse could possibly draw behind it, and this, together with their sure-footedness and steadiness, makes them safe

in places where accidents would be almost certain if horses were used.

Then too, as we have seen, the donkey will live and thrive where a horse would starve. Donkeys will eat almost anything that grows — will browse upon the coarsest bushes, which a horse would not touch. It is not necessary to carry along food for the donkey. He is simply turned out to browse while the traveler is in camp, and he is to be depended upon to find enough to eat if there is any vegetation around.

The donkey can also survive longer without water than a horse can. In the desert regions this quality is of special importance. For there are few streams and springs, and often the water necessary to keep man and beast alive has to be carried along. It is said that the burro can go two or three days without water and food and no serious results will follow. Few horses could stand such hardship without serious injury.

Thus we see that the much-despised and ill-treated donkey has his work to perform, and he usually does it well. He is slow, but sure-footed and steady. To the prospector, the miner, the mountain or desert traveler in the great West, his services have been and are still almost indispensable.

CHAPTER III

THE MULE

The mule is a hybrid animal. That is, it is the result of a cross between two distinct types of the horse family: the ass and the horse.

Mules may be used for all purposes to which horses are adapted, and in some work may be used with greater advantage. Mules excel horses in their capacity for hard work, their endurance, length of life, and economy of feeding. The mule is also less subject to disease than the horse. As an instance of the endurance of these animals, they may, in cases of emergency, be worked for twenty-four hours or more without water and for even two or three days without food. Such treatment would permanently disable a horse, but the mule will fully recover. The value of this ability to endure hardship is of especial importance in the rough work of wagon trains, during army movements, and this is the reason why mules are almost invariably used on army wagons.

For heavy and continuous draughting work, under difficult or unfavorable conditions, mules are generally preferred to horses. Although

their temper may be less certain than that of horses, they are less excitable, and therefore are better suited for work where plunging or an unsteady gait would be dangerous. Mules are almost invariably used for drawing heavy farm machinery, such as the large harvesting machines used in the Western States.

In the Southern States two types of mules are known, and they have been given names suggesting their special fitness for the different work that they have to do in the southern industries: the "cotton mule" and the "sugar mule." The cotton mule is a smaller and cheaper animal. The work in the cotton field is not so heavy, and a smaller animal may thus be used. The sugar mule is a larger, more powerful, and much more valuable animal. The work in the sugar-cane fields is very heavy and arduous, and only a powerful mule is capable of performing it. The economy in feeding and caring for mules, together with their ability to stand heavy and continuous work, and their freedom from disease make them specially fitted for the conditions of cotton and sugar raising. In fact, so important a factor has the mule become in this work, that it is doubtful whether the industries could be successfully carried on without him.

The management and care of mules are practically the same as for horses.

CHAPTER IV

THE COW

Wild Cattle

In the last chapter you have read that it is stated by scientific men, who have given a careful study to the question, that the forefathers of the present domesticated horse, the wild horses, lived and wandered in herds over dry plains; that they developed their quick hearing, their keen eyesight, great staying powers, and high speed in their endeavors to escape being captured and eaten by the enemies which lived around them.

Now, if you observe and consider the natural habits and bodily formation of our domesticated cattle, you will come to the conclusion that their wild forefathers, the wild cattle, could not have lived on open, dry plains, but that they must have lived in wet and marshy districts, which were probably well studded with trees.

As one proof of this, compare the foot of a horse with the foot of a cow. The foot of a horse is round, — it is really the nail of the third toe lengthened, hardened, and rounded, — hard,

all in one piece, and so just suited to galloping at a great pace over dry and hard land.

The foot of the cow, on the contrary, is really formed from two toes, with a slit between them. In consequence of this slit formation, the cow has no difficulty in walking through

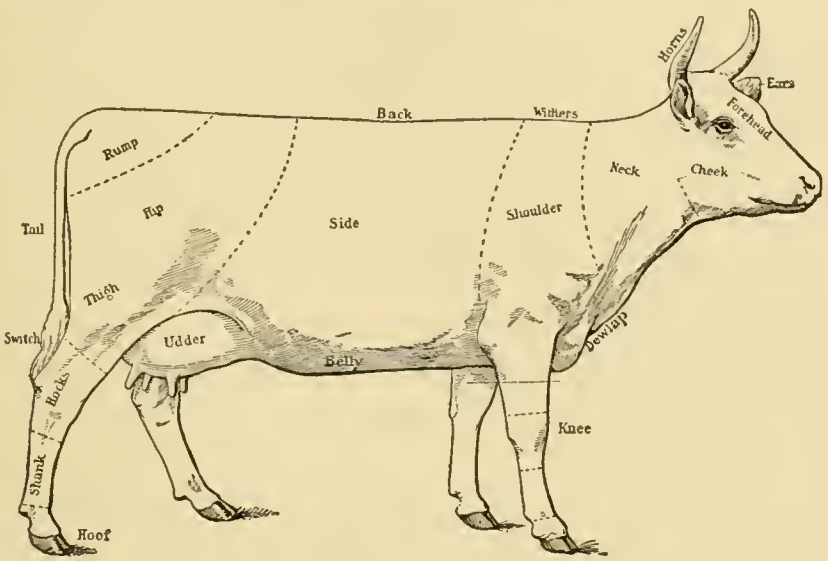


DIAGRAM OF THE COW.

marshy land. But the foot of a horse will sink into marshy land, and as it acts like a sucker, it can only be withdrawn with a great muscular effort; thus really making double work of traveling.

As you know, on level, hard ground a horse can outpace a cow or ox with the greatest ease. But race a horse and an ox over boggy land, and the ox will probably beat the horse.

Travelers tell us that, wherever wild cattle are found, they will not of their own accord wander far away from woods; and you must

have noticed how the cattle around you love to stand knee-deep in water, and under the shade of trees.

You have read that a wild horse trusted to his speed to escape from his enemies; but the wild cattle trusted more to their horns and great strength of neck to defend themselves against their foes. It would take a very hungry, very desperate pack of wolves, or other beasts of prey, to attack a herd of wild cattle when at bay, with their sharp horns and stout necks as weapons of defense.

Men in the old days took advantage of this strength of neck and horn to use the ox for doing the work of the farm instead of using horses. In some parts of our country, especially in portions of the Southern States, oxen are still in very general use, and to-day pairs of oxen can be seen harnessed with a very old-fashioned form of yoke, — a yoke which fits on the nape of the neck, — with which the animals draw the carts or wagons. In France the yoke is fastened to the horns and brow, so that the horns, brow, and neck bear all the strain of carting heavy loads and dragging the plow. This will show you the immense strength of the ox's head, neck, and horns.

An ox or cow is a very patient beast, not nearly so nervous or given to alarms as a horse.

Speed and alertness and a very sensitive nature were necessary on the part of the wild horse to enable it to escape from its enemies, and so this nervous disposition has been handed down, and is inherited by the horse of to-day.

The wild cattle, on the other hand, knew that their best weapon of defense was their stout, strong neck and powerful horns, and that they could defend themselves best by standing together at bay, with their heads down, and calmly awaiting the attack of their enemies. This disposition has been handed down to the domestic cattle, and is seen in the patient, slow-moving ox and cow.

As the cow only makes a sufficient quantity of milk to fill its calf's large stomach and satisfy its hunger, perhaps twice a day, the calf must take in a large quantity of milk at one meal. In consequence of this it would have small chance of escaping from its enemies by speed, as does a colt, which has a small stomach and requires food often and in small quantities. Therefore, to obtain the large quantity of milk food that its young requires, the cow most cleverly conceals her calf while she wanders away, it may be for hours, to graze a sufficient quantity of herbage to turn into milk with which to satisfy her calf.

Of course, when the cow is near her calf, she will defend it to the death against any beast of

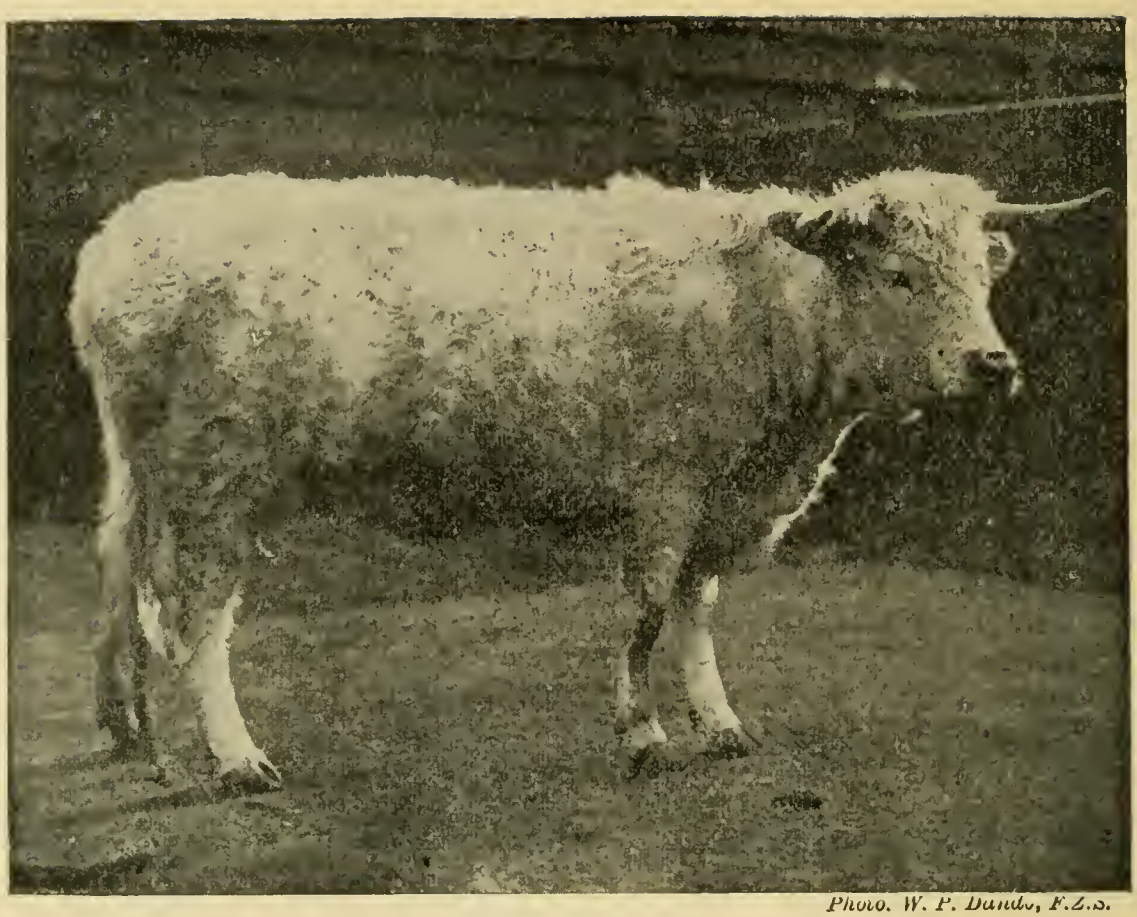


Photo. W. P. Dando, F.Z.S.

ENGLISH WILD COW.

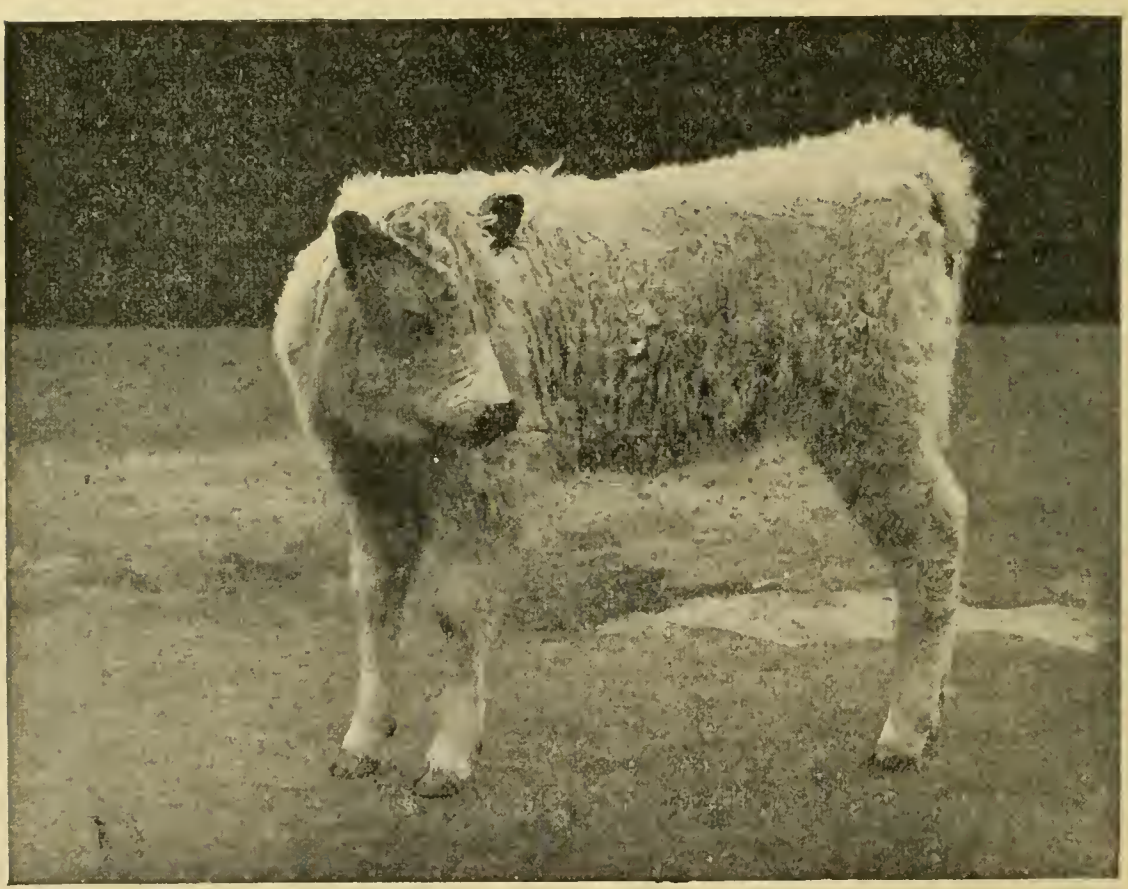


Photo. W. P. Dando, F.Z.S.

CALF OF THE WILD COW (ABOVE).

The reduction of size in the picture, as compared with that of the cow, is less.

prey that may attack it, and her horns, backed by courage and strength of neck and head, are very effective and terrible weapons of defense.

You can now see why a cow has the means for storing a large quantity of milk.

Man has taken advantage of this natural storage of milk, and has turned it to his own uses.

Moreover, by careful feeding, housing, and attention generally, by taking away the calf from its mother and rearing it by hand, and especially by breeding from those cows which give naturally the greatest flow of milk, man has very considerably increased the quantity of milk given by the cow of to-day, as compared with the quantity given by her ancestors in their wild state.

You will notice, when a foal lies down, it stretches itself out at full length with no effort at concealment. But a calf will always curl itself up, as if anxious to conceal itself.

Then you must have observed that, when a horse is alarmed, he throws his head as high as he can, as if he wanted to get as extensive a view as possible of the approach of an enemy. But down goes the head of a cow if she is alarmed, as if she were looking for the approach of her enemy amidst the trees.

So, from the formation of a cow, her foot, her

power of giving large quantities of milk at one time, the habits of herself and her calf, it is thought that the wild forefathers of our present domesticated cattle lived amidst marshy ground thickly studded with trees.

The native wild cattle of America are commonly called "buffaloes," although their proper name is bisons. In some way the name buffalo has come into general use, and few people even know that the name bison has ever been applied to our native cattle. These cattle existed on the plains of the Far West in countless numbers; but with the building of the Overland Railroad to California and the westward advance of civilization the enormous herds of these great animals which once roamed over the boundless prairies have been reduced to a very few individuals which are only to be found in our protected national parks. The animal is therefore practically extinct as a wild animal.

The wholesale destruction of the buffaloes is not very creditable to our American civilization; because the animals were ruthlessly slaughtered solely for their skins, while all the rest of the carcasses was wasted. It is said that only the skins of the cows were used, as the bulls' skins were difficult to handle. No wonder, therefore, that within comparatively few years the animals were practically exterminated.

THE BISON.

Milk

A young calf has to grow, that is, to make muscles, fat, bones, horns, hoofs, and hair. If the calf is left naturally with its mother, it builds up all this and grows on milk as its only food. Therefore you must come to the conclusion that milk is a perfect food, especially for young and growing things. This conclusion of yours is borne out by scientific men who by different methods have carefully analyzed or examined milk. And they will tell you that milk is made up of four principal parts, namely: water, fat, curd, and salts or solids.

The water of the milk is simply the fluid in which the fats and curd are suspended and the salts or solids are dissolved. The water of the milk is present in much larger proportion than any of the other ingredients, though it is not the most important; it is only the carrier of the nourishing portions of the milk.

The fat of milk is the portion from which butter is made. It supplies fat to the animal and so keeps it warm.

The curd of milk is the portion from which cheese is made. It supplies the animal with material for making muscle and lean meat.

If you dry up a quantity of milk, you will find that there is left behind very little solid mat-

ter. This solid matter is made up partly of milk sugar and partly of mineral salts, which the young animal requires to build up its bones and make them strong and elastic.

So you see milk gives to the young animal fat and warmth and materials from which to form muscle, lean meat, bones, hoofs, horns, and hair.

There is nothing that requires more care, cleanliness, and sweet surroundings and an even, cool temperature than milk, cream, butter, and cheese.

Milk takes up odors very readily. If you stand milk in a room smelling strongly of any powerful odor, say onions, salt fish, or paint, the milk will soon absorb the odor, and the butter which is made from it will smell and taste in like manner.

If butter is made in a proper manner and amidst clean surroundings, it will have a sweet, pleasant odor, but if you allow it to remain in an unclean, badly smelling place, it will very soon absorb and give off an unpleasant odor.

Not only bad odors and dirty surroundings affect milk and all that is made from it, but the food of the cow will affect the flavor and smell of milk and butter.

A cow fed on clean and sweet, wholesome

hay and feed, or grazing on clean, well-drained pasturage where there is growing a variety of sweet, nourishing grasses or clover, and above all where she can get a plentiful supply of pure water, will give wholesome milk, rich and sweet to the taste. Such milk will yield butter of a good, rich, straw color, and of pleasant, sweet flavor. But a cow fed on poor, dry feed, containing little nourishment, and having dirty, foul-smelling water to drink, can never give rich, wholesome milk of good flavor.

Strong-smelling herbs or roots fed to a cow will also impart disagreeable flavors to her milk. Strong turnips, wild onion, or garlic, "May weed," and other strongly aromatic plants, when eaten by cows, often wholly destroy the usefulness of their milk. In some parts of our country, where the pastures are poor, the cows often graze on aromatic plants, with bad results to themselves and their milk.

So you can see at once that, if your cow is to supply you sweet-smelling, nicely flavored, rich milk and butter, the greatest care must be taken to make all her surroundings as clean and as healthy as possible. Also, the pasturage and other food which the cow eats must be of such a nature as will enable her to yield good, rich, untainted milk.

How to make Butter

The butter of the milk, called "butter fat," floats about in small globules in the milk itself, and these are called "fat globules." So tiny are these small globules that it takes two thousand of the largest of them and twenty thousand of the smallest of them, placed side by side, to cover an inch.

Cream is really highly condensed milk, rich in fat, and when you make butter, your one object is to isolate or separate these fat particles or globules from everything else in the milk.

When we make butter, we use the cream of the milk, because the cream contains most of the fat globules, and consequently they are more easily separated or "broken away" than if we were to use whole milk. The first thing to do in making butter is to separate the cream in as short a time as possible.

There are two methods of doing this — the old and the new. The old method is as follows: The warm milk as it comes from the cow, at a temperature of about 96 degrees, is taken to a cool place or "dairy," where it is placed or "set" in shallow vessels or pans. To cause the cream to rise as quickly as possible, the dairy should be kept cool, or better still, the shallow

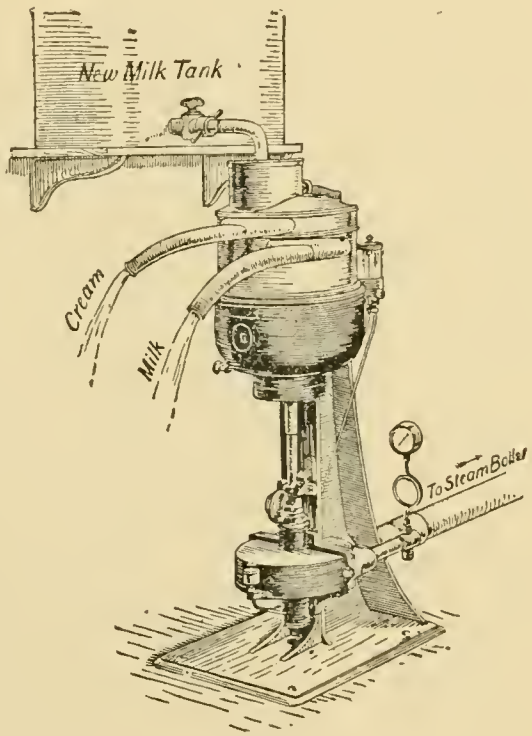
vessels containing the milk should themselves be placed in clean, cold water.

As the fat globules are lighter than the other ingredients, they naturally rise and collect together in a condensed mass on the surface of the milk. When the cream has fully risen to the top of the milk, it is skimmed off and placed in vessels to allow it "to ripen," as it is called. This ripening process is necessary, because after the cream has passed through it, it is in the most suitable condition for making butter. The ripening is the result of a process of fermentation, by small germs working on the cream, very similar to the work of fermentation which in bread-making causes the dough to rise.

The process is something like the souring of milk, and the proper point of ripening is best told by experience, although there are some scientific tests to determine it. Such tests are, however, applicable only in large dairies.

The new method of extracting the cream is by the use of a machine called a "cream separator." The fresh milk is run into the interior of the separator, which is so arranged that it can be revolved at a very great speed. This high rotary speed causes the watery particles, which are the heavier particles, to fly outward, on the same principle that a stone or weight attached to a cord will fly outward when twirled

rapidly. The watery portion, therefore, collects at the outer edge of the rapidly revolving interior portion of the separator, where a device is arranged to conduct it to a spout from which it runs as separated or "skim" milk. The fat globules of the milk, being lighter than the watery particles, are at the same time retained nearer the center of the revolving bowl, where a device is also arranged to conduct the fat or cream globules to another spout from which they issue from the separator as cream. So the separated or skim milk runs out of one tap, while the cream runs out of another. The separator extracts 92 to 98 per cent of the cream, whereas the setting in shallow vessels extracts only 80 per cent.



A SEPARATOR.

When separators were first invented, they were designed for and used in large dairies only or by persons owning a large number of cows. The larger machines required steam or other power to operate them. At the present time smaller

separators are manufactured, which may be run by hand-power; so it is now possible and profitable for the small farmer, or one who owns only a few cows, to operate a separator. The skim milk however, left after skimming the cream from the milk set in shallow vessels, has more feeding value than the milk obtained from the separator, because the latter, being deprived of practically all of the fat globules, is no longer as complete a food as the hand skimmed milk. This fact the farmer has to take into consideration when he uses separated skim milk in feeding his calves.

At the same time it should be borne in mind that instead of having to keep the milk twenty-four hours before it is skimmed, it can at once be placed in the separator and the cream extracted in a very short time.

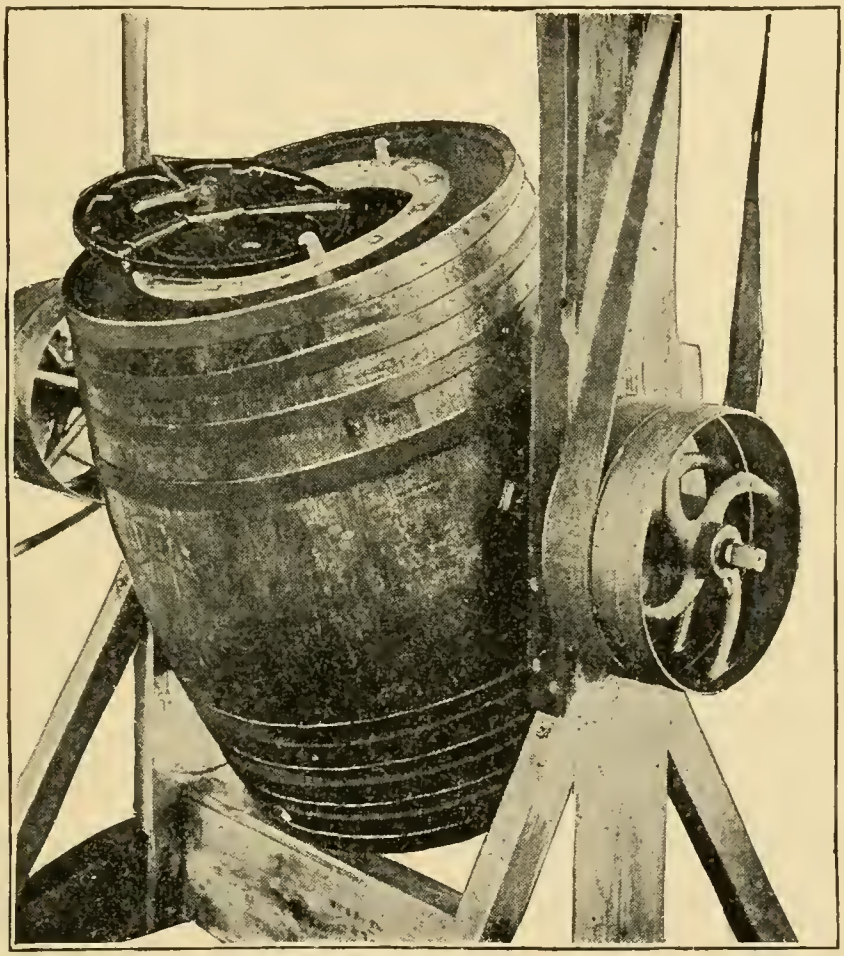
This is an advantage, because there is less chance of the cream taking up any smells or dirt that there may be about, and less chance of its being affected by the weather. Moreover, the cream from the separator is more uniform, and therefore makes a more uniform quality of butter.

Uniformity of quality is essential in supplying the large modern markets.

When the cream is ripened, that is when it is in the best condition for making butter, it is churned.

Churning

The object of churning is, by violent concussion, to break up the butter globules of the cream and mix air with them until the minute fat



BARREL POWER CHURN.

globules adhere together to form small grains of butter about the size of wheat kernels.

There are many kinds and styles of churns. All, however, have the same end in view, namely, subjecting the cream to a violent

concussion or dashing motion. No doubt many of you have seen old pictures of farm housewives churning by simply moving a "dasher" up and down and through the cream. Butter can be made by simply shaking the ripened cream in a partly filled bottle or "fruit jar." Many mechanical churns have been invented. Some have the body stationary, having a system of dashers which are operated by mechanical means. Others inclose the cream in a tight, angular vessel and then revolve the whole churn, thus dashing the cream about and against the sides. Most of the large power churns are made on this principle.

Although nothing but cream or fat is supposed to be placed in the churn, there always remains a quantity of milk mixed with the fat globules, which becomes "buttermilk," when the fat globules have united into grains of butter. The buttermilk must be drawn away from the butter grains. This is done by draining it from the churn by means of an opening provided for the purpose. Fresh water is then added and the churn is operated again for a short time, and the water drawn off. This is repeated several times. The water has the effect of washing away all the milk which surrounds the butter grains, and when the stream of water from the churn runs quite clean, you know that

the water has done all that it can to remove the buttermilk.

The butter grains must then be removed from the churn and worked by hand. This working by hand should consist simply of pressure in order to form the butter grains into solid butter, and in doing so press out any buttermilk which may still be left. In working butter you must see to it that no slipping, sliding, or ladling motion be used, because butter worked in this way loses its granular structure, and becomes greasy and poorly flavored. One test of first-class butter is its granular structure, that is, when the butter is cut or broken, the little wheat-sized grains must be discernible through the mass.

Remember also that butter is a very sensitive substance, and that there are very few hands fitted to press these butter grains into solid butter. The reason of this is that there is constantly coming away from most human hands an insensible perspiration, which affects the butter, making it greasy. In the whole operation everything which touches the butter must be kept cold: another reason why the human hands should not be brought in direct contact with the butter. Warmth will make it greasy and cause it to lose its flavor. Much good butter is spoiled in the working.

All sorts of implements have been invented, so that in removing the grains from the churn, pressing the grains into solid butter, forming the butter into different shapes or patterns pretty to the eye, it need never be touched by the human hand.

In America butter is nearly always salted, the quantity of salt used varying according to the taste and requirements of the market to be supplied.

Great care must be used in salting. If the salt is not thoroughly mixed with the butter, the latter will look streaked or marbled, and will not bring the highest price. The best time for adding salt is when the grains are first taken away from the churn. The salt is mixed by turning the salt and butter over and over. The butter should then be allowed to stand for a short time until the salt is dissolved, and then the "making" should begin.

When the salt has been dissolved and the butter grains pressed into solid butter, it must remain in a cool place, covered up with a wet muslin cloth. The wet muslin cloth keeps the butter cool. The cooling is caused by the rapid evaporation, or escape into the air, of the water in the cloth, and the escape of the water into the air from the cloth draws the heat from the butter and so cools it. The cooling makes the

butter firm, and adds to the length of time it will keep good and sweet. In fact butter cannot be kept fit for use if it is allowed to become heated.

Remember that in taking your butter to the market, not only should it be well made, of a nice, straw-yellow color, and of a good flavor, but it should look clean and attractive to the eye. It will then bring a few cents more per pound, and possibly make the difference between a profit and a loss.

Butter should be firm and not greasy, so that when you cut it with a knife it cuts clean and does not stick to the knife.

Butter is supposed to contain nothing but fat, but even the best made butter contains only 83 to 88 per cent of fat, the balance being nearly all water.

How Cheese is Made

The second great product made from milk is cheese. There are many kinds of cheese, differing from each other in flavor and appearance. These differences are due to different methods of making and ripening or curing, and also to differences in the feed cows obtain in different parts of the world. The different kinds of cheese usually bear the names of the countries or localities where the particular kind of cheese

L. of C.

is made, as, for example, Swiss cheese, Edam cheese, Stilton cheese, and Cheddah cheese. Some of these different kinds of cheese are also made in other countries than those in which they originated. Thus, Swiss cheese is made in the United States.

It would take far too long to enter into minute details of the various methods of making the different cheeses. But there are certain general principles that guide the making of all hard cheeses.

You have just read that butter particles are independent fat particles which float about in the body of the milk and, being lighter than the milk, collect at the surface when the milk is set in shallow vessels, or is rapidly revolved in the separator.

Now, the curd from which cheese is made does not float about independently in the milk, and will not rise to its surface when the milk is still or when it is rotated. The curd is bound up in the milk itself, and the great essential in making cheese was to find something that would compel the milk to deliver up its curd—to cause the curd to solidify.

On examining the stomach of a calf that had been feeding on the natural milk of its mother, it was discovered that there was something in the fourth compartment of the stomach that

compelled the milk which the calf had swallowed to deliver up its curd. In fact, the curd necessary to make cheese was found in the fourth compartment of a calf's stomach. A substance was then made from the fourth compartment of calves' stomachs, and called "rennet."

There were some old-fashioned methods of forcing the milk to give up its curd, but the modern method of "renneting" the milk, as it is termed, is by far the best.

The new milk is strained and run into large vessels or vats. These vessels have around them or underneath them jackets which contain water or steam, so that the milk can be warmed or cooled as the cheese maker wishes.

After the milk is run into the vat, it is warmed, and the rennet is added. The curdling at once begins. This curdling shows that the rennet is forcing the milk to surrender its curd.

The curd gradually begins to appear in the vat as a solid mass which, when formed, can be cut with a knife.

The liquid portion of the milk now left is called "whey," and this whey is run out of the vat by means of a tap.

The curd mass is heaped up and allowed to drain; it is cut with a special kind of knife so as to allow as much of the whey to escape as possible. Some salt is then added and mixed

thoroughly with it. The curd is then cut into small pieces by a mill, and is placed on a "cheese form." These cheese forms are then placed in a press, and great pressure is exerted upon them until the cheese is made firm and free from whey.

You can see at once that this rolling, heaping up, cutting, and pressure are to make the curd firm by forcing out of it all the whey.

The cheeses have then a cloth bandage placed round them and are taken into a curing room, where they remain under careful treatment until they are ready for eating.

It must not be forgotten that the butter fat still remains in the curd and therefore in the cheese; in fact, it is the butter fat which gives cheese a rich flavor.

Sometimes cheese is made from milk from which a large portion of the butter fat has been removed by the separator, thus making it possible to produce both butter and cheese from the same milk. In order, however, to give such cheese its full share of fat, other fats have to be added in the process of manufacture. Such cheese has been named "filled cheese," and it is very inferior to that made from the full milk. It is really adulterated cheese.

The whey, all that is left of the milk after the curd and butter fat have been taken from it, con-

tains the sugar and most of the ash, and of course a little butter fat, — not much, — that has been left behind.

Whey therefore must have some good feeding properties, though not so many as skim or separated milk, because skim or separated milk has had only the butter fat taken from it, while the curd still remains in the milk.

Whey must be used at once while sweet, because its sugar soon turns to lactic acid, and then it is valueless for feeding.

Whey, when good, helps to keep and fatten pigs, and therefore, on farms where cheese is made, a sufficient number of pigs ought to be kept to use up the whey.

There is no work connected with a farm that requires a more lengthened experience than cheese making, and there is no work harder and more anxious. A high order of workmanship is required in order to turn out a first-class and well-ripened cheese.

Many years ago, all the cheese and butter sold in our markets were made on the farm by the farmer who owned the cows. Every farmer was his own cheese maker and butter maker. Nowadays most of the butter and practically all the cheese sold in our large markets are made in "creameries" and cheese factories. These creameries and cheese factories buy the milk from the

farmers of the neighborhood. The factories are fitted up with the best machinery and the work is in the charge of men who devote their entire attention to the making of cheese and butter. In this way, not only is the process of manufacture cheapened, but the products are more uniform.

How a Breed is formed and kept True

It is well known by most people that there are a great many different kinds of cattle, and it is also well known that each kind is called a "breed." Now we often hear certain men spoken of as originators of breeds. Let us see just what this means, and also learn, if we can, how there came to be different kinds or breeds of animals.

All our domesticated cattle have descended from the same parent stock, the nearest representatives of which are to be seen at the Zoölogical Gardens in London, England. These cattle are known as Chillingworth cattle, because a certain number of them have run wild for generations in Chillingworth Park, situated in the northern portion of England.

If these cattle had been left wild in their native locality, they would probably be much the same to-day as they were centuries ago. Let us suppose, however, that some of these original wild cattle were transported to different parts of the world. They would naturally find conditions

different from those existing in their native home. Climates would be different and the grasses and herbs upon which they would have to feed would also be different. The animals would, therefore, have to become adapted to these new conditions, and gradually changes would occur. If these slight differences were accumulated through a number of generations, the descendants would at last become so different from their original ancestors that the result would be a new breed. You see, therefore, that simple change of conditions will form a new breed if sufficient time elapses.

But how does a man secure and fix a breed? will naturally be asked. He must, of course, have some cattle to start with. He may have certain ideals in view as to what he wishes his cattle to become. He may wish them to yield him more milk in proportion to the food which they eat, or he may wish them to produce a heavier weight of well flavored, tender meat at an earlier age. He therefore selects such animals as vary slightly in the direction toward the ideals he has in mind.

If greater quantities of milk are desired, he weighs the food given to each animal and also weighs the quantity of milk yielded, and its fat contents. If meat improvement is wanted, the food given to the animal and its gain in weight

at short intervals are recorded. Then he selects and rears only calves of such of his strong and healthy cows as give the largest return in milk or live weight for the feed consumed.

Pure-bred stock is "registered." This registering gives the animal what is termed a "pedigree." That is, all of the parents, grandparents, great grandparents, etc., have been registered, and therefore the full family history of the animals is known. These family histories are recorded in what are known as "herdbooks" of the different breeds, and they are maintained by national associations of breeders.

In buying registered animals — which are always high-priced — the family history recorded in the herdbook should be carefully studied, so that the buyer may know all about the descent of the animal which he is purchasing.

These are the methods by which the well-known breeds of cattle have been established. We therefore have to-day breeds suitable to all kinds of uses and adapted to all kinds of conditions and requirements. Some cattle have been bred solely for their milk, and naturally everything else about the animal has been sacrificed for milk production. The breeds which have been established with this sole purpose in view are known as "dairy breeds" of cattle.

We have seen that the main purpose of these

dairy breeds is to produce milk — the largest quantity of the richest milk in proportion to the food which the animals eat. As will naturally be expected, these dairy cattle do not fatten well. If you see a fat cow, you may, as a rule, be sure that that cow's yield of milk is not large in quantity or rich in quality. Most of what the cows eat should be made into milk; hence the best dairy cows do not fatten. This is often cited as an objection to their use by the ordinary farmer. It is said that after his dairy cow ceases to be profitable as a milk producer, she is almost valueless, as she cannot be fattened for first-class beef. Therefore it is argued that a breed which will serve both purposes is the best for the general farmer. And there are such breeds, as we shall see later on.

While there are breeds established solely for milk production, there are, on the other hand, breeds which turn nearly all of the food which they consume into fat and meat. The amount and quality of their milk is low, and they are bred solely for sale to the butcher. These breeds are known as "beef breeds" of cattle. They are altogether different in appearance from the dairy breeds.

The general outline of a good dairy animal when viewed from the side may be compared to the outline of a wedge; and a cow which

possesses this outline to a great degree is said to conform to the desirable dairy wedge shape. The beef cow's outline is that of a parallelogram.

Breeds of Dairy Cattle in America

All of the breeds of cattle to be found in the United States were imported from Great Britain and the western portions of Europe. It is probable that all had a common origin.

From the writings of Julius Cæsar and Pliny, two thousand years ago, we learn that wild cattle lived in the forests which at that period covered most of the land around what is now the great city of London. It is thought that the natural conditions which prevailed resulted in the formation of two distinct types of cattle — one of which found existence on the high, dry, and rocky uplands, the other of which reveled in the richer herbage of the moister plains.

The cattle which lived amidst the rougher surroundings of the hillsides acquired hardier constitutions and were leaner and rougher-looking than the cattle of the plains. The cattle of the plains, on the other hand, grew sleek and fat. It is altogether unlikely that there was any intermixing of the two strains, and in time two distinct types of wild cattle were established.

In the domesticated cattle of to-day we can trace special characteristics which were fixed by

life on the hills or life on the plains in the remote past. The Ayrshires, the Irish Kerries, the Scotch Highland cattle, have the hardiest strain of their remote hill ancestors in their veins, while the Jerseys, the Guernseys, the Holstein-Friesians, and the Devons have the more delicate strain of their remote ancestors of the plains. The well-known Shorthorns or Durhams seem to embody characteristics of both hill and plain strains. We have therefore in the Shorthorn a general or dual purpose animal.

Straight Dairy Breeds

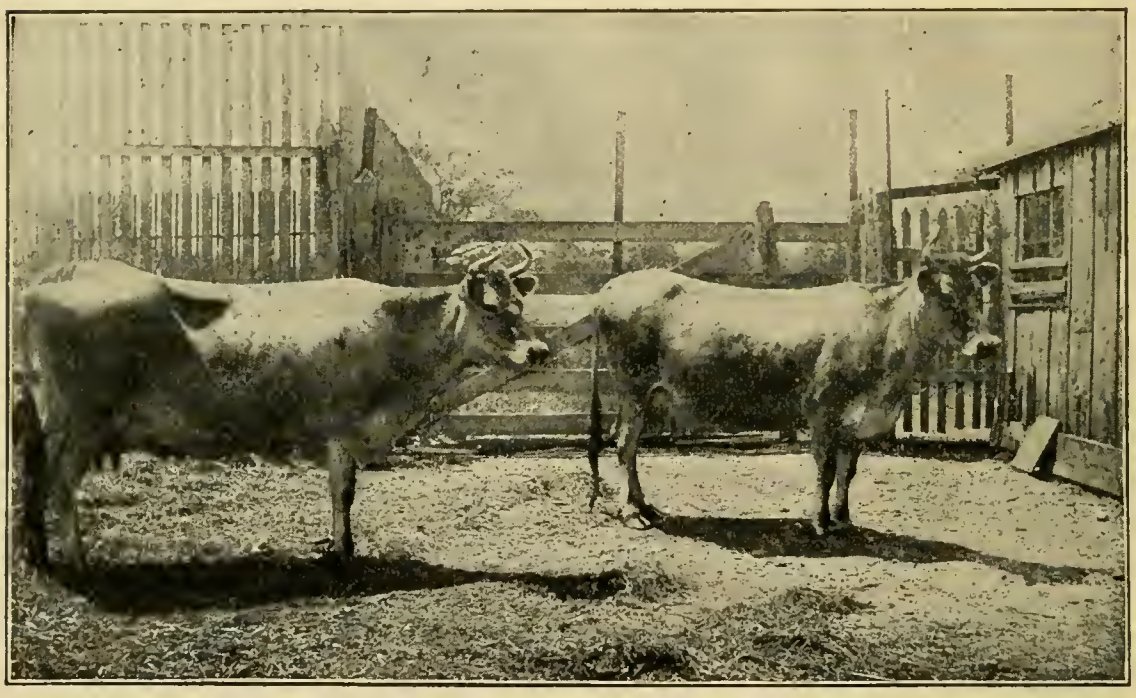
The principal breeds of cows used in the United States for dairy purposes are Jerseys, Holstein-Friesians, Ayrshires, Guernseys, Dutch Belted, and Kerries. There are many thousands of registered pure-bred animals of these breeds, and in addition a great many more which have been either crossed with common stock or which have not been bred sufficiently true to be admitted to register. Nevertheless, there are many excellent animals among this latter class. The breeds mentioned above are strictly milk breeds. There are also a number of breeds suitable both for beef and milk production, which are largely used in our country, as we shall see later on.

We will now give a short account of the breeds named. A detailed description of each

would occupy too much space for our little book, and in addition would be very dry and unsatisfactory reading. The only sure way to learn all about a particular breed is to study the points from the animal itself.

The Jersey

This breed takes its name from the Island of Jersey, one of the Channel Islands which lie south of Great Britain. The island is about



JERSEYS.

45 miles from Great Britain and only 13 miles from the coast of France. It is 11 miles long and averages less than 6 miles wide, just about the size of Staten Island in New York Harbor. All the arable land of the island is owned by about

2000 persons; the size of each holding ranges from 3 to 30 acres. The total number of inhabitants is 60,000. In manners and customs the people are more French than English, the prevailing language being the old Norman French. Notwithstanding its proximity to the coast of France and the prevailing French tendencies, the Island of Jersey is one of the most loyal parts of the British Empire.

The island is noted for its great productiveness. Owing to the mild climate, which has an average temperature of about 50 degrees with an average yearly rainfall of about 30 inches, three crops a year may be produced. The staple crop is potatoes, which being marketed earlier than either the French or English potatoes in the London markets realize a higher price.

The Jersey breed of cattle was developed and fixed on this island. The original stock, in all probability, came from Brittany, one of the northern provinces of France. A law was passed in the year 1779 prohibiting the importation of any living animal of the bovine tribe. This law has been strictly enforced to the present day, and has enabled the Jersey breeders not only to develop and fix a type of cattle wholly suited to their ideals, but the prohibition of importation has kept the island free from the many diseases of cattle which have raged elsewhere. As a

consequence, the Jersey cattle possess a good constitution, are vigorous, and are especially free from disease in their own country. They are the smallest of the dairy breeds of cattle, and owing to their high breeding are inclined to be nervous and delicate when introduced into countries having more rigorous climates than that of their native island; yet, perhaps, no other breed of dairy cattle has been more widely introduced throughout the United States. They are to be found in all portions of the country either as pure-bred animals or as "grade" animals. The breed is therefore an exceedingly adaptive one.

In consequence of the limited area of the Island of Jersey and the great value of the land, the cows are never turned out loose to pasture. Instead, they are tethered, the tethers being moved about several times a day. The cattle are never driven; they are always led. And this is usually done by women. The animals, therefore, are accustomed to kind treatment, and have become in consequence very gentle and docile, although somewhat nervous. In their native home they are out-of-doors most of the year, and are often milked in the field.

Grass and roots, chiefly parsnips, which are grown in great quantity for this purpose, are the chief food given the cattle; little or no grain is given them.

Owing to the fact that the cows of the Island of Jersey produced more milk than the inhabitants required, a market had to be found for the surplus. If fresh, sweet milk could not be marketed, butter could; so, naturally, the breeders of Jersey Island cattle bred and fixed a type of animal which would produce milk especially rich in butter fat. Therefore it is that the milk of Jersey cows is to this day the richest in butter fat. It takes only two gallons, on an average, of Jersey milk to make a pound of butter, while it requires from two and one-half to three gallons of other milk to make the same amount. The milk is often so rich that it has to be diluted before calves and young children can be safely fed with it.

Some very careful tests of Jersey cows have been made. From 140 cows kept under average dairy farm conditions, and recorded for 6 years, a yearly average of 515 gallons of milk per cow, yielding 293 pounds of butter, was obtained. Good cows have yielded 350 to 400 pounds of butter per year, and in exceptional cases 600, 700, 800, and even as high as 1000 pounds of butter are said to have been produced by one cow. In addition to being exceedingly rich in butter fat, Jersey milk has the fat globules very large and uniform. This makes separation of the cream and churning very much easier than is the

case where the fat globules are small or not uniform. The butter from Jersey milk is of a rich golden color.

The Jersey cows range from 700 to 1000 pounds and the bulls from 1200 to 1800 pounds in weight. Sometimes strains are bred up which average larger and heavier.

The color of the animals varies considerably. For a time it was thought that, in order to be pure, the cattle of the Jersey breed had to be a solid color, that is, all of one color. This is erroneous. There are registered Jerseys of all shades of brown to deep black, and of various shades of yellow, fawn, and tan colors to a creamy white. There are some mouse-colored or gray; some are light red, and a few are brindled. There are also some high-grade Jersey cattle which are spotted, either with large or small patches of white occurring on any part of the body.

The Jerseys are large feeders, and they will bear very rich feeding. In good animals all the extra food consumed, over and above the amount they require to support them in health and strength, is converted into milk. The greatest drawback to their use by general farmers is that as soon as they pass the profitable milking age their usefulness practically ceases. Having been bred solely as butter-

making machines, they do not fatten easily, and hence cannot profitably be used for beef. The profit from the Jerseys must be made during their milking period.

The Holstein-Friesian

This is one of the oldest and most notable of the dairy breeds. The breed has been known under different names, both in Europe and America, and there was considerable dispute before the present name was adopted. "Holland Cattle," "North Hollanders," "Dutch Cattle," "Holsteins," "Dutch-Friesians," and "Netherland Cattle," are some of the names which have been given to the type of cattle that are now recognized as Holstein-Friesians.

It is claimed that this breed of cattle can be traced back two thousand years, and the breed has ever since occupied the same territory, a territory which has always been noted for its dairy products. Tradition informs us that before the beginning of Christian times, two tribes settled on the shores of the North Sea. One tribe possessed a race of pure white cattle, while the other tribe possessed one nearly pure black. In course of time the two tribes intermingled, and there was in consequence an intermingling of their cattle. The mixture produced the characteristic black and white spotted animals which are

typical of the Holstein-Friesian breed as we know it to-day.

Perhaps we cannot do better than quote in full an extract from Farmer's Bulletin No. 106, of the United States Department of Agriculture, which gives an excellent description of the methods of rearing these cattle in their native land.

"The preservation of the Friesian people and their continued adhesion to cattle breeding for more than two thousand years is one of the marvels of history. Always few in number, the conflicts of war and commerce have raged over and around them, yet they have remained in or near their original home, continuously following their original pursuits. Their farmhouses are fashioned after the same general model; the one immense roof covers everything that requires protection. Here the cattle find shelter during the long and rigorous winter months. Here they are fed and groomed and watched for months without being turned from the door. Here the family is also sheltered, sometimes with only a single partition between the cattle stalls and the kitchen and living room. Everything is kept with a degree of neatness marvelous to those not accustomed to such system. The cattle become the pets of the household. At the opening of spring or when grass is sufficiently grown they are taken to the fields and cared for in the most

quiet manner. Canvas covers protect their bodies from sun, and storm, and insects. The grasses upon which they feed are rich and luxurious, and the animals have to move about very little to gather sufficient food. On the first appearance of winter they are returned to the stable and the simple round of the year is completed. This round is repeated until the cattle are six or seven years of age, when they are usually considered as past the period of dairy profit and are sent to the shambles. The object is always to produce as much milk and beef as possible from the same animal. With this twofold object in view, selection, breeding, and feeding have been continued for ages." (Houghton.)

The Holstein-Friesians are the largest of all the dairy breeds. Their frames are big and bony, and usually well filled out. The animals of this breed have strong constitutions and are large feeders, but they are dainty about their food. If they are to yield the largest profit, they must have an abundance of rich food without the necessity of much exertion to obtain it. They are quiet and docile.

The calves are large and almost always strong and thrifty; they grow fast and fatten easily. The heifers reach their full maturity at two and a half years old. The cows range in weight between 1000 and 1500 pounds. The bulls,

when they are full-grown, are very large and heavy, often weighing over 2500 pounds.

The breed is famous for producing enormous quantities of milk. Many cows, it is said, have given each month more than their own living weight in milk, for 10 or 12 consecutive months. There are many instances on record of one cow giving each day 100 pounds, or 10 gallons of milk, for several days in succession, and 20,000 to 30,000 pounds of milk, or between 2000 or 3000 gallons, in one year. Average cows are expected to give 40 to 60 pounds (4 to 6 gallons) per day.

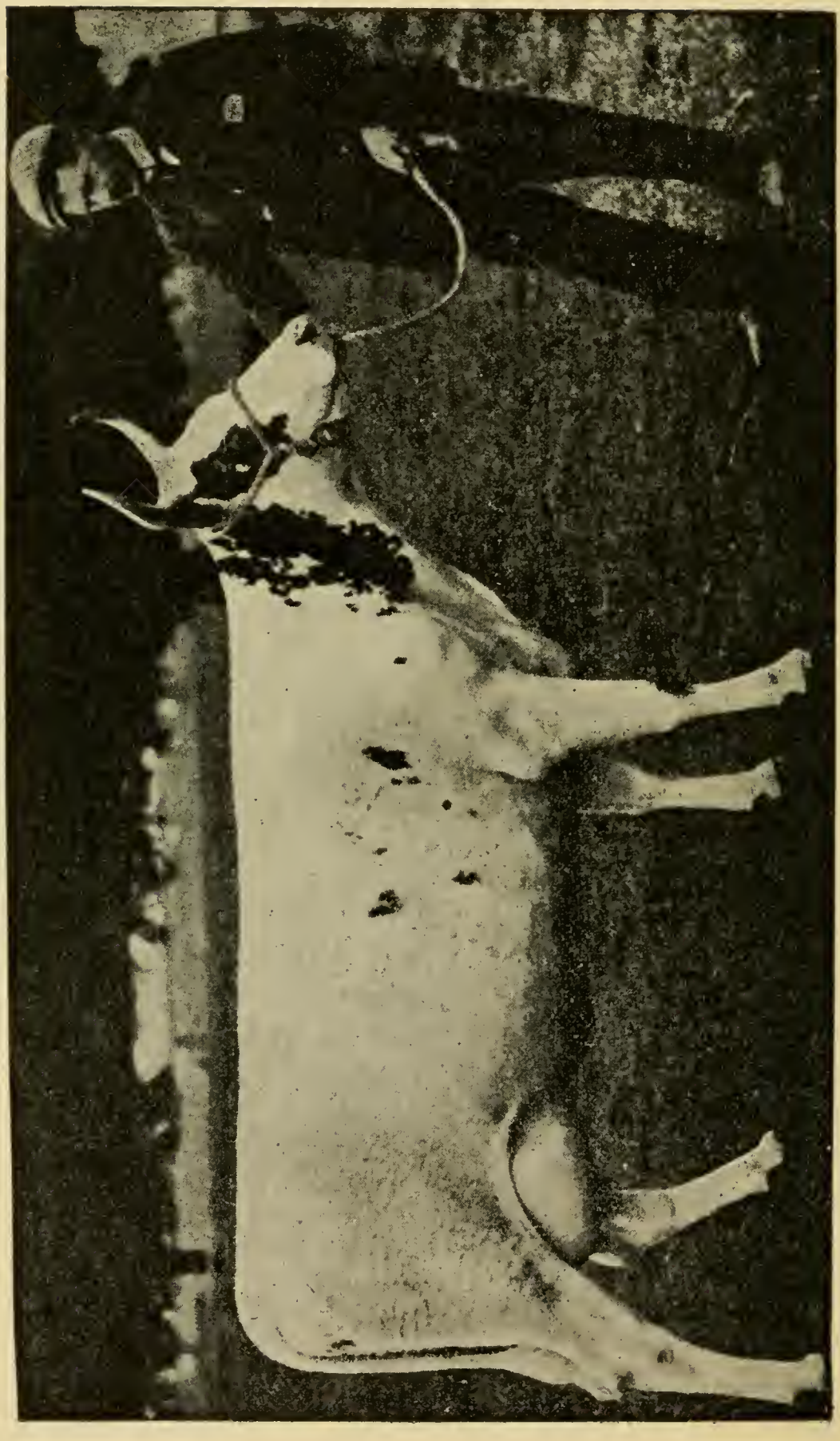
Holstein-Friesian milk is not as rich as Jersey milk in butter fat. But owing to the enormous quantities of milk which the cows produce, it does not require a large percentage of butter fat to yield large quantities of butter, and the average yield of butter per year is larger than it is for the Jerseys. One herd, it is said, averaged 308 pounds of butter per year for 4 consecutive years. There are also records of 500 and 600 pounds of butter per year, and one instance is recorded where a cow yielded 1153 pounds in a year.

Holstein-Friesian milk also differs from Jersey milk in the small size of its fat globules. The globules are uniform in size, but the butter does not carry a high color.

The Ayrshires

This breed of cattle takes its name from the county of Ayr, in southwest Scotland, where the strain was bred and fixed. The county of Ayr is eighty miles long and borders on the river Clyde and the Irish Sea. It is a country of moderate fertility, with an undulating surface and a great deal of woodland. The climate is moist and rather windy, but it cannot be properly classed as severe. The natural vegetation is somewhat poor and scanty, and therefore the cattle have to wander considerable distances to obtain the food that they require. This has made the animals of this breed hardy, active, and well able to shift for themselves. They are therefore well suited to a hilly and rugged country, where good herbage is scarce.

The Ayrshire breed is one of the youngest of the well-established breeds. It was established wholly during the nineteenth century, and is thought to be nearer in relationship to the Chillingworth cattle, the wild cattle of Great Britain, than any other breed. It is said that, owing to this fact, the Ayrshires are rather wild and nervous. They must, therefore, be handled with the utmost kindness and patience. Kindness, gentleness, and firmness will gain their confidence and



AYRSHIRE COW.

render them more easily controlled. But lose your patience and excite them, and they will use their horns to some purpose.

The Ayrshire cattle are not large. The average weight of the bulls at maturity is 1400 to 1800 pounds, the weight of the cows ranging from 900 to 1100 pounds. They give a fair supply of milk, more than the Jerseys, but not as much as the Holstein-Friesians. One thing in their favor is the fact that they can be fattened for the butcher when their milking qualities fail. The animals give meat of good quality.

The yield of milk from Ayrshire cows is good. Herds have been bred which have yielded from 3500 to 7000 pounds of milk per cow in one year. The percentage of fat in this milk averaged $3\frac{1}{2}$ per cent, which therefore yielded about 150 to 300 pounds of butter annually.

But the Ayrshires do not make good butter cows. The fat globules of their milk are small, and not uniform in size. The cream does not separate readily, and the butter is not easily churned. In addition, it lacks color. Their milk makes a satisfactory cheese, but, considering them as a whole, they are best suited for milking purposes. The yield of milk is fairly abundant, and it is fully within the usual legal requirements for fat percentage.

The Guernsey

This breed derives its name from another of the Channel Islands, the Island of Guernsey. The island is 9 miles long and 4 wide, and in shape resembles a triangle. It contains 16,000 acres, with a population of 35,000. Market gardening is the chief industry, cattle rearing being secondary in importance. There are only about 5000 cattle owned on the island.

Like the Jerseys, the Guernseys probably descended from old Normandy and Brittany ancestors, but the breeders of the Guernsey cattle have retained more of the old Norman and Brittany characters than have the breeders of the Jersey strain. The same rigid exclusion of outside cattle prevails as in the Island of Jersey.

The Guernsey cattle are more like the Jerseys than any other breed of cattle, but they are larger in the bone and are coarser looking animals. They are usually light in color, yellow and orange predominating, with considerable white, mostly in large patches on the body and legs. The muzzles are almost invariably buff or flesh-colored. A characteristic of the Guernsey breed is the orange-colored skin. This can be seen especially about the eyes, in the ears, about the udder, and where the hair is white. In fact,

this secretion of yellow coloring matter seems to extend to the milk as well, because the Guernsey milk is very highly colored, and the butter made from it has a higher natural color than that from any other milk. It is thought that the yellow color of the skin is in some way responsible for the deep, rich color of the milk. Whether this is so or not would be hard to prove or disprove; nevertheless, the fact remains that Guernsey milk is "richer" colored than any other.

A herd of 15 Guernsey cows, on a strict test, averaged 6626 pounds of milk per cow over a milking period of one year. The average of butter produced by each cow was 418 pounds. This bears out what was said above, regarding the richness of the Guernsey milk. It averages 15 to 16 per cent of total solid matter in the milk, 5 to 6 per cent being butter fat. It takes about 17 pounds of Guernsey milk to make one pound of butter.

Dutch Belted Cattle

As the name of the breed implies, these cattle are so marked that they appear to have a wide belt, or girdle, around the body. They are jet black in color, with the exception of the broad band of pure white which encircles the body, beginning just at the back of the shoulders and extending in width nearly to the hips. In the

cows the white band covers a portion of the udder. The breed originated in Holland, where it is said to have been established for over two centuries. It is probable that, like the Holstein-Friesian, this breed had its origin in the white and black cattle of the tribes which settled on the shores of the North Sea. The fixing of a strain of animals which shall reproduce faithfully so peculiar a marking as exhibited by these cattle is one of the marvels of careful breeding and hereditary selection.

There are not many representatives of the Dutch Belted breed in the United States. They are very docile and fairly hardy, and yield large quantities of fairly rich milk. They are about the same size as the Ayrshires, but much quieter animals. One of the best representatives of this breed yielded thirty-two quarts of milk a day for a week on grass alone. This cow was vigorous and productive until she was eighteen years of age.

Kerry, or Irish, Cattle

This breed and a smaller breed called the Dexter Kerries are the only breed of any prominence which are natives of Ireland. These cattle are growing in favor in England, but they are very little known in the United States. The Kerries form as nearly as possible an aborig-

inal breed; that is to say, their ancestry can be traced back almost continuously to the original wild forest stock. The animals are dark in color, nearly always black. The cows give a fair

DEXTER KERRY COW.

amount of milk of good quality, and they can be easily fattened for beef, although they are rather small for American markets. The mature bulls weigh from 800 to 1100 pounds and the cows from 600 to 800 pounds. It is said that what is lacking in size is more than made up in the excellent quality of the meat.

The Kerry cattle are noted principally for their hardy nature. They come from the county of Kerry, in western Ireland, the most mountainous district of that country. They will live and do well in poor districts where the more delicate milk breeds would starve.

The Dexter Kerry cows are the smallest type of milch cows in existence, and they produce, in proportion to their size and the quantity of food they eat, a really enormous quantity of milk.

The breeders of this strain positively declare that their cows produce more milk in proportion to the food which they eat than any other breed in existence. They are especially fitted to be kept as family cows, being no larger than a large-sized donkey, and very hardy; they will yield a good quantity of milk on very rough forage. They are very tame, and require very little space in which to keep them.

Beef Breeds

So far we have considered cattle especially bred and fed for the production of milk. Now, just as we have milk breeds, bred and maintained solely for their yield of milk, so we have breeds of cattle, bred especially for beef. In most cases the production of beef has been attained at the expense of milk production, so that, as a rule, the beef cattle are very inferior milkers.

The development of cold-storage transportation facilities has greatly changed the method of marketing beef. At one time the local demand for meat was supplied by neighboring farmers, sending their cattle into the home markets to be bought and slaughtered by the local butchers. The development of rapid transportation and refrigerator facilities has made it possible to assemble large numbers of animals in the great cities, where the slaughtering and butchering is done on a large scale; the slaughtered beef being distributed to great distances in refrigerator railroad cars. Moreover, at these large slaughterhouses, all of the offal is utilized, being manufactured into a number of useful products, such as tallow, lard, fertilizers, glue, etc.

A few years ago practically all of the cattle shipped to the large slaughterhouses were what are known as "range cattle"; that is, they were bred and grazed on large tracts of land. Little attention was paid to the careful breeding of the animals, and they became more or less wild in their habits. There are still great numbers of range cattle in our far western country, but there is a growing tendency toward grading up or improving the rougher strains by the introduction of carefully bred stock.

The appearance of the animals bred for beef production is very different from those which

have been bred for the production of large quantities of milk. The milk animal is, on the whole, usually thin, bony, with legs rather long. The beef animal, on the other hand, "is built" on square and stocky lines. The chief object in beef production is to rear an animal that will yield the greatest amount of tender, well-flavored meat on the smallest amount of food. The beef animal is, therefore, well-rounded, the bones well-covered, the neck and legs short; in other words, the animal when dead should cut up into as little waste meat and bone as possible.

The breeds which are used especially for beef production are the Herefords and Aberdeen-Angus. To these we might add the Texas, or range, cattle.

The Hereford

This breed takes its name from Herefordshire in England, where the strains existed from which the Hereford breed as we know it to-day was originated. The Herefords have the beef form to a marked degree. They are squarely put up, and are vigorous from birth. They grow very rapidly, come to maturity early, and fatten easily and quickly. The animals of this breed have proved themselves fitted to live and do well in various climatic conditions; so that they have

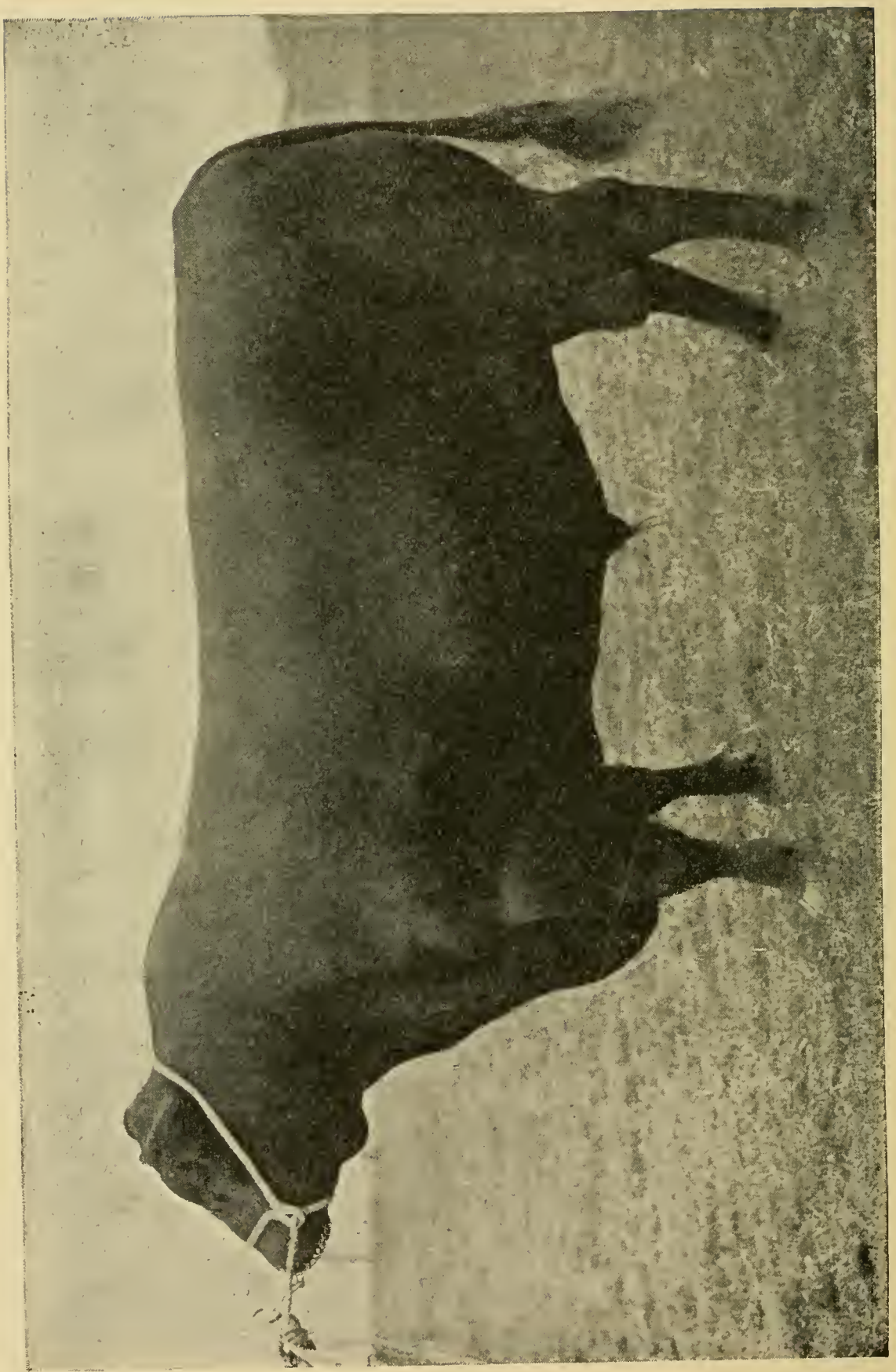
become favorite beef cattle in all parts of the world.

The color of the present-day Hereford is usually red, and the breed is characterized by a white face and white under the body, with a white switch at the end of the tail, and white feet. The white face is a distinct mark of the Hereford breed. The animals of this breed are large: mature bulls weigh from 1900 to 2300 pounds, and cows from 1200 to 1600 pounds.

Aberdeen-Angus

This breed has been known under the names of Polled Angus, Polled Aberdeen, and Scotch Polled. The breed is of Scotch origin, and is considered by many to be the highest type of beef breeds. The animals are large, but the meat is of excellent quality. In England the Scotch beef is in great favor, and brings a higher price than any other beef that enters the markets. It seems that the Scotch farmer, not having many populous centers to which he could send his milk, has devoted his attention to the production of a good beef animal, which can be transported long distances. Well has the Scotchman succeeded, for no better beef animals are bred in the world than the Scotch Aberdeen-Angus cattle.

The Aberdeen-Angus cattle are characterized



ABERDEEN-ANGUS BULL "CHAMPION DIAZ."

by their shining black color, and they possess no horns. From this they have gained the appellation "polled Scotch," the word polled meaning without horns. They are large, fatten easily and rapidly, are vigorous and hardy, and have the special quality of shifting well for themselves. They therefore make excellent range animals. Mature bulls weigh from 1800 to 2200 pounds, and cows from 1100 to 1500 pounds.

Texas Cattle

Over the plains of the great West there have roamed for many years herds of cattle which were practically wild. These cattle undoubtedly originated from Spanish animals introduced into Mexico at the time of the Spanish Conquest. No attempt was made in former years to breed these cattle in order to produce the best results. It was far easier to allow them to roam at will and to allow them to breed naturally. Each year the owners of the herds branded the calves which were found with the cows bearing the owner's mark. This branding was done by burning the skin with an iron heated red hot. No other attention was given the cattle. They were allowed to roam over the vast unbroken plains, and thus to graze without restraint. At marketing time the cattle were "rounded up" by the "vaqueros," or "cowboys," and driven to

market, where they were either slaughtered or transported by railroad to the large cities.

Naturally, the animals produced under these haphazard conditions were greatly inferior to the types which were bred with a definite ideal in view. The Texas cattle were therefore small, their weight ranging from 900 to 1200 pounds. They were somewhat gaunt and long-legged, and were characterized by exceedingly long horns, which in many cases measured four feet from tip to tip.

General Purpose, or Dual Purpose, Breeds

So far we have read of cattle suitable generally for but one purpose, either milk or beef. It is of course desirable to have special purpose breeds where one is engaged in the production of special products, be they milk, cheese, butter, or beef. But it is desirable for the general farmer to possess animals which may be used for all purposes, should occasion require it. We have seen that the milk cattle make poor beef cattle, and that the beef breeds are poor milkers. But there are some breeds which are useful for both purposes, and these have been designated as the General Purpose, or Dual Purpose, cattle. Under this heading we may include Shorthorns or Durhams, Polled Durhams, Devons, and Red Polled cattle.

The Shorthorn

The Shorthorn is a breed of cattle that combines good milking powers and good beef-making qualities, that crosses profitably with almost every other variety, — especially the Aberdeen-Angus, — and whose young become profitable at an early age. The Shorthorn lives and thrives on any class of land, except the very high ranges, and in almost every variety of climate found in the United States.

If the farmer requires a plentiful supply of rich milk, the Shorthorn will supply that want. If the farmer requires to fatten and not to milk, the Shorthorn will do that. If he wishes a calf to be turned into veal at the earliest date, the calf of the Shorthorn will satisfy his need.

In sunshine and rain, on heavy land and light land, whether to graze in the field or to be chained in the stall, the Shorthorn is equal to it all. Therefore these animals are more popular, and are more widely bred and kept in the United States than any other breed.

The Shorthorn is level from the neck to the tail, — in some cases as level as a table, — deep from the hip to the udder, light in the fore-quarters, wide at the shoulder top. She treads along lightly and gracefully, carrying her well-bred head high and with pride.

The Shorthorn has reached its present usefulness through careful selection and preservation on the part of stock raisers.

Remember, you can all do a great deal to improve the milking powers of your cows by

PRIZE SHORTHORNS.
(The Property of Lord Rothschild.)

keeping and rearing only the calves of those mothers which have yielded you a plentiful supply of milk.

This of course means keeping careful record of the amount of milk that each cow gives each day; and this naturally means taking trouble. But nothing successful has ever been accom-

plished, whether in the country or in the towns, without hard work and taking trouble.

The Shorthorns have been the most famous breed of cattle both in the United States and in England. The importation of the Shorthorn into America was begun soon after the close of the Revolutionary War. Great attention has been given to the careful breeding of the Shorthorn in America, and in consequence there are several American strains which have become famous the world over. In fact, at one time, British breeders acknowledged freely that there were Shorthorns in America which could not be equaled even in England.

In size the Shorthorns are probably the largest of the pure breeds. Bulls ordinarily weigh a ton or more and sometimes weigh as high as 3000 pounds. Mature cows weigh from 1200 to 1600 pounds. The colors of the breed have always been red and white variously blended. In the best milking strains the cows are angular in outline. They are quiet and kind in disposition.

The Shorthorn milkers give a good supply of rich milk. Single cows have been known to give as high as 12,000 pounds of milk in a year. The average of the best milking strains is from 6000 to 7000 pounds per year. The milk is of good quality; the fat globules are not small, and

are uniform in size, so that the cream separates readily. The cream is pale in color.

The Polled Durham

The Polled Durhams are now considered a distinct breed, and as such are the only breed of cattle which has originated in America. The breed was developed in the Ohio and Mississippi valleys, within thirty or forty years, and it is simply a hornless variety of Shorthorns. In every respect they conform to the Shorthorn type, with the exception of horns. They have the size and shape of the Shorthorn, and may be classed with that breed in being a valuable general, or dual purpose, animal, although the production of milk has undoubtedly been of secondary consideration in their breeding.

The Devon

The farmers on the rich lands of North Devon, in the southwestern part of England, have produced a very pretty breed of rich red and well-shaped cattle. Their limbs are light and bodies rounded, the head is light and tapering towards the muzzle; their horns have a beautiful curve and are of a creamy color. The hair is soft and fine, and often curls closely on the neck, shoulders, and face. There is no more perfect outline in cattle than a well-bred,

Photo. Charles Reid.

RED POLLED CATTLE.

Photo. Charles Reid.

DEVON CATTLE.

fairly well-fattened Devon. Some of the Devon cows are good milkers, although the breed is considered more as a beef breed. The steers of this breed make excellent work oxen.

As a rule, Devon cows are not large and persistent milkers. But that the breed has good milking qualities is shown by the fact that milking strains have been developed which average from 40 to 50 pounds of milk per day. The milk is rich, and ranks second only to the Channel Island breeds in butter fat and high color.

Devon cattle thrive on very meager pasture, and have shown themselves easily adapted to various climatic conditions. They do equally well in the hilly sections of New England and on the poor pastures and pine lands of the South.

Red Polled Cattle

This is comparatively a new breed, as it is only within late years that it has been recognized as a distinct breed. Red Polled cattle resemble the Devons almost as closely as the Polled Durhams resemble the Shorthorns. It is not probable, however, that the Devons and Red Polled are closely related. As we have seen, the Devons come from the southwestern portion of England, while the Red Polled had their origin north of the Thames River in England.

According to very early records, some of the progenitors of the Red Polled breed were superior milch cattle. Eight gallons of milk per day is mentioned as the average during a large part of the season.

Some of these hornless cattle were brought to the early English colonies in America, and the so-called "muley" cows so often seen in many parts of the United States are, in all probability, descended from them.

In general appearance the Red Polled cattle have more of the beef type than the dairy form. They seem better adapted for making meat than milk. Yet the development of milking parts — large udder, prominent milk veins — has been better maintained in this breed than in the Devons.

Red is the required color, only a white tip to the switch of the tail and sometimes a small white spot on the front part of the udder being allowable in pure-bred animals.

The milk of the Red Polled cattle is not so rich as the Devon milk, but it is produced in rather larger quantity. Good herds average from 5000 to 5500 pounds of milk per cow during the year.

How to treat a Cow

The cow herself (and this is most essential) must be kept healthy and free from disease.

She must be treated with the greatest kindness and consideration.

Many a cow has been ruined as a milker because she has been roughly handled while milking, or been milked by one without experience, or by one whose hands are rough and hard, and who has not that delicacy of touch that tempts a cow to give, with pleasure and ease, all the milk that she has made.

The cow house must be warm, well-ventilated and lighted, and free from draughts; it must be well-drained and built on a dry foundation, and must be situated so as to catch as much of the winter sun as possible. When she is fastened up, each cow must have plenty of room to move and lie down.

There is a terrible disease that it is feared is very prevalent amongst the milking cows throughout this country — a disease called tuberculosis, which corresponds to consumption in the human being. Undoubtedly, this disease has been caused in the past, and is being caused in the present, by not observing the great health principle of sufficient light and ventilation, sensible drainage, absence of draughts, and a wise and experienced method of feeding.

As with us, so with a cow, when her strength and health are feeble she is liable to take any disease there may be about; whereas, if her

strength and health be vigorous, she is much less liable to contract disease. In other and more accurate words, the disease germs have a much better chance of settling and beginning their work of ill-health and destruction in a cow low in condition, than would be the case in a cow that is vigorous and in good health.

It is necessary to repeat, because it is so important, that if you wish your cows to be healthy, and therefore to be profitable, cleanliness, light, ventilation, freedom from draughts, sensible feeding, suitable sites for the cow house, are necessities.

At the present time, to keep your live things in poor condition, or to starve your crops, is the most foolish thing that you can do, because sooner or later, and generally sooner, it means failure and ruin.

Of course, any good farmer who knows his business will take every opportunity of turning his cows out in the fields during the winter for as long a time as the weather will permit.

It is not generally done, but it adds considerably to the health of a cow, and therefore to her supply of milk, if every day during the winter, when she is in the stable, she is curry-combed or brushed over with a rough brush so that her body may be kept clean.

CHAPTER V

THE SHEEP

Wild Sheep

It is impossible to name, with certainty, the native country of the wild sheep from which our domesticated sheep have descended. Sheep are mentioned in the Bible as the servants of mankind, and this gives proof that before the time of which we have the earliest historical record, the sheep was a domesticated animal. The good shepherd, who tended his flocks and saw that the helpless lambs were sheltered during stormy weather, even at the risk of his own life, is a lesson to us all. It is said that sheep were first domesticated for the sake of their milk and skins. Primitive man's clothing in cold climates consisted often of the sheep's skin, which was worn as a protection for the body.

Although we cannot be sure of the line of descent of our domestic sheep, nevertheless we find in them traits similar to the wild traits which travelers tell us can be observed to-day in the wild sheep inhabiting different countries of the world.

The wild sheep of to-day live on high, mountainous places, constantly covered with snow.

BLACK-FACED MOUNTAIN SHEEP.

On the slopes and terraces of these cold heights they take refuge when danger is near, and live on the scanty herbage which they find there.

The ancestors of our domesticated sheep developed their covering of wool, muscles of leg, and power of neck and head, in order that they might live with the greatest advantage amidst their wild, cold, mountainous surroundings.

Generally speaking, they inhabited open moun-

tainous districts rather than the very craggy regions occupied by the wild goat.

Rocky Mountain Sheep

The "Bighorn," or Rocky Mountain sheep, is the wild sheep of North America. It derives its name from the great curled and crumpled horns which adorn its head. It inhabits the high, rough, and cold altitudes of the Rocky Mountains, and, consequently, it is seldom seen by travelers. The Bighorn is very shy, and at the least sign of danger is off among the rocks and crags of the mountains.

The coat of this beautiful specimen of wild life is composed of thick hair, like the coat of a deer or of a goat. It is coarse to the touch, but comfortably soft and spongy, and is an excellent covering to keep out the cold and the wet. The wool is rather sparse, white, and very soft; it grows beneath the hair, out of sight, and chiefly around the shoulders. As one writer well expresses it: "The wool grows in beautiful spirals out of sight among the shining hairs, like delicate climbing vines amidst stalks of corn."

The cousins of the sheep — the antelope and deer — had a good chance of escaping from their flesh-eating enemies by their extraordinary swiftness of foot; but the sheep, not having this power so highly developed, had to adopt some

ROCKY MOUNTAIN SHEEP.

other means of saving themselves from extinction, and so they took to the snow-covered mountain sides as a refuge.

The feet of the wild sheep are wonderfully adapted for their life among the high mountains. They are so cushioned and shaped that they can cling to the smallest ledge and the sharpest projection, while at the same time their shape enables them to fit into the crevices of the rocks over which the animals must travel.

Travelers tell us that it is a grand sight to see a flock of these wild sheep, some as large as donkeys, with their enormous wrinkled horns, moving with wonderful grace and agility amongst the crags on the mountains, or resting on the mountain summits, sometimes at a height of more than 12,000 feet.

The experience of the past has made the wild sheep of to-day very wise. When they rest they select for warmth a position that catches the sun and a spot that gives their sentinel a wide lookout, so that he can easily see the approach of their special enemies,— the wolves. Often they place themselves so that the scent of an enemy will be borne to them on the wind, whichever way it approaches.

If any danger is approaching, the alarm signal is given, and the scattered flock gathers together in a body to obey the instinctive sheep law of

"Follow the leader"—a law that the experience of ages has taught the sheep is best for their escape and safety.

These wild sheep have no great open plains over which to gallop away, where it does not so much matter if they are in a compact body, directly following their leader, or not. But they have to escape mostly along narrow ledges cut in mountain sides, and so their wisest plan is to collect together in a dense long body and to follow faithfully their leader.

In that rushing, headlong flight, with a pack of hungry enemies at their heels, the flock are compelled to follow every movement of their leader, whether that movement is in direction, speed, or leap.

While scurrying up and down these steep places, broken here and there with yawning chasms and deep ravines, the individual sheep has no time to look and judge for itself.

In the most perfect imitation of their leader lies their safety, and woe betide that flock whose leader wavered and faltered, whose judgment was at fault, or whose nerve and speed were not at their best.

Wild Habits still Linger

If we notice carefully our domesticated sheep, we may observe that they retain many interesting

habits that were useful to their wild ancestors, but which of course are not necessary now.

It is by observing the natural ways and habits of the young of animals that we are able to decide, with great certainty, what were the ways and habits of their remote ancestors.

Let us now consider some of these curious habits which all of our readers must have noticed.

Lambs when at play select the steepest part of a field, and, if there is a rock or log lying about, they will skip on to it and butt at one another from it.

The shepherds of the Southdown sheep tell us that if any of their flock, during the night, break from their fold, most of them are to be found on the highest ground of the neighborhood.

Lambs have long legs, and when a few days old are capable of keeping up with the flock. If this had not been so, the beasts of prey would soon have made an end of the race of sheep.

If a flock of sheep, scattered over a field grazing, become alarmed, or if the sheep dog be sent amongst them, they will immediately collect in a body and follow the leader.

If one sheep of a flock gets through a partially open gate, all the rest will blindly follow the lead. And it will be found a very difficult job

to stem the rush. Many a shepherd's boy has found this out to his sorrow. The flock will throw him off his feet and rush over him before he will be able to stop them.

If a sheep jumps down from a height, say down a sunken fence, and the others are alarmed, the whole flock will collect and jump down from almost the same spot, even at the risk of breaking their slender legs.

If a dog enters a field where there are ewes and lambs, he will often be attacked by the ewes if he ventures too near. This is probably a relic of the old wild instinct, when the horned flocks on the mountain side defended themselves against jackals and wolves.

An angry ewe will often stamp her feet when a dog comes in sight. This is probably the relic of a danger signal that the wild look-out sheep gave to the flock it was guarding.

It also may be a signal that the animal intends to fight; like a man, before he begins to fight, turning up his shirt sleeves, or waving his clenched fists about in the air.

Animals closely related to the sheep will use their sharp hoofs with deadly effect.

For instance, deer will destroy snakes by jumping on their bodies, and with a quick outward movement of their feet will tear them to ribbons.

Travelers tell us that antelopes use this method of attack, and hunters have been killed in this way by the big antelopes that live in the Himalaya Mountains in India.

For purposes of defense, sheep in the wild state developed great strength of neck and the hardest of hard heads. Even very young lambs often butt each other's head with very considerable force.

And if two powerful rams get together, they will charge blindly at one another, at several yards' distance. Down will go their heads, the butting of their two skulls sounding like a clap of thunder. The recoil will drive them backwards, but up they will get and attack each other again till one is the victor, or the neck of one is broken.

The Sheep of the Farm

It is said that sheep were first domesticated for the use of their milk, and when the wool had developed by domestication and selection at the expense of the goat-like hair, the skin was used for clothing. But it is a long step from the time when sheeps' skins were worn as clothing, to the time when the sheeps' wool alone was dyed, spun into yarn, and manufactured into cloth of many colors and patterns. In ancient times, when the whole skin was worn, it did

not matter much if there were some coarser hair mixed with the wool. But nowadays our woolen manufacturers will not accept a wool which is at all mixed with hair.

The hairy portion has been gradually bred out of the wild sheep's wool. At first there was only a very small portion of fine wool, growing about the neck of the wild sheep. With this as a foundation the yield of wool has been gradually increased and the coarse hair has been gradually reduced, until to-day we have sheep whose entire coat is composed of fine wool, suitable for spinning and weaving. But it has taken a great deal of careful breeding and selecting, and it required long periods of time to effect this very useful result.

The breeding of sheep for mutton is comparatively a recent development. One and a half centuries ago an Englishman named Robert Bakewell began the first systematic breeding of sheep to improve their qualities for food purposes.

It must not be forgotten that good animals for any particular purpose never come by chance. They are the results either of systematic breeding on the part of some careful man, or they are the results of certain conditions of environment or food, or both. Whenever, then, any of our readers see a good animal filling some particular place in man's service, they may be sure that

animal is the result of much painstaking and careful thought. Thousands of animals have had to be rejected before the type which that animal represents was developed and fixed.

Man, by his systematic observation, selection, and preservation can accomplish a great deal. He can "twist and turn" the line of descent in almost any direction he may wish. He can develop some slight trait which he observes in an animal, until in the course of generations it becomes dominant and fixed. But the trait, no matter how slight or undeveloped it may be, must be present. The characteristics may be very slight indeed; as, for example, the fine wool must have originally existed on the wild sheep. Without it man could never have succeeded in developing the wool sheep of the present day. We might as well expect the potter to shape a figure without clay, — out of nothing, — as to expect man to develop a character, the rudiments of which were not originally present.

From what has been said, it will be seen that nowadays sheep are bred for two purposes, — for wool and for mutton. Most of the sheep kept in the United States up to a few years ago were for the production of wool, but during the past few years the demand for mutton sheep has been steadily increasing in the United States. It is said this may be due, partly, to the low

prices which have prevailed for wool, thus inducing many sheep owners to market their animals for mutton. There has been a great diminution of the number of sheep in the United States, undoubtedly due to the low price of wool.

The production of prime mutton for both European and American markets is fast becoming a vast industry in the United States. There is abundant opportunity in this country for the expansion of the industry. There is a great deal of rich land and abundant and rich food for sheep. Then, too, there is no reason why the mutton sheep should not be so selected and bred that he will yield wool as well as mutton.

It has been a common but erroneous notion that sheep are suited for, and can therefore be profitably kept only on, cheap, and consequently inferior land. It is true they can live on lands where the vegetation is scanty, but they will yield a larger profit if fed and housed with care, and kept on higher-priced lands. In England on strictly sheep farms 680 sheep are sustained per 1000 acres; in Scotland the number runs as high as 1380 per 1000 acres. In the United States, the leading agricultural states have not exceeded 25 sheep per 1000 acres.

It would pay far better to feed the sheep with much of the grain we grow, than to export this

grain and feed the sheep solely on poor pastures. In our corn-producing states, for example, a great deal more feed in the shape of corn and oats is produced than is needed at home. Hence a large proportion of the crop has to be marketed abroad. The cash returns to the farmer are not always profitable. But by feeding some of the surplus to sheep, a larger profit would be obtained by the farmer. The price paid for corn and oats in the shape of good mutton is much higher than for the same quantities of those feeds marketed in the raw state. Then, too, the sale of $1000 worth of corn takes from the soil about $300 worth of its fertility. Market the same amount of corn in the shape of mutton, and only $50 worth of fertility is removed. If the wool only is marketed, about $2 or $3 worth of fertility is removed. These figures, of course, prevail only where the manure produced by the sheep goes back to the land.

With mutton as the primary object, the sheep industry of the United States has been placed on a more permanent and lasting basis. The production of mutton pays independently of the wool produced, so that whatever price is obtained for the fleece is clear gain. The wool will always have some value. The demand for good mutton, as we have seen, is steadily increasing.

The Sheep of the Range

In the eastern and middle western parts of the United States sheep are kept on a farm basis. That is to say, the animals are fed, are housed, and in every way are given the close care which is expended on farm animals. In the far Western States sheep are seldom kept as farm animals. They are in those sections of our country kept as range animals; which means that they are kept in herds, often of many thousands, and are driven over the ranges, to feed on the natural herbage. There is, in this case, no attempt at feeding for any special purpose or with any particular ideal in view.

The ranges over which the sheep are driven and allowed to feed may be private land, either leased or owned by the flock owner. These lands are usually of low grade, not fit for agricultural purposes, or the stubble-fields after the grain has been harvested.

In the far Western States, where sheep herding is practiced on such a large scale, grain farming is also conducted on a gigantic scale. One farmer may farm thousands of acres. This extensive farming has made it necessary to perform the work of harvesting and threshing the grain as quickly and as cheaply as possible. To accomplish this, enormous machines are in use,

which are drawn by as many as twenty-eight or thirty-two mules or horses, and which cut, thresh, and clean the grain at one operation. These machines are called "harvesters." Naturally, in doing the work on such a great scale, there is a great deal of grain which, in addition to the chaff and straw, is left on the land. The harvest stubble-fields, therefore, form good grazing, or dry pasture lands, for the sheep, hogs, or even cattle.

But often the sheep are driven over government lands. Where this plan is pursued, the flocks are kept in the valley during the winter. As spring comes on they are driven toward and into the mountains, going higher as the season advances and feeding as they go. In this way a great deal of feeding or pasturage is obtained free, as it has been the custom to drive the sheep on the government lands without asking leave of anybody. Even the great mountain forests have been and are still used to a great extent. In the early days, when there were few settlers in the Far West, no one disputed the right of the flock owners to use the public lands in this way. But with the rapid advance of settlement, and the "taking up" of the public lands, the problems relating to the rights of individuals to use unoccupied lands are puzzling the authorities.

There is another and more serious problem connected with sheep grazing on our mountain sides and upon our plains. As is well known, the sheep is a close feeder; he will eat almost everything in the way of vegetation, be it grass, herbage, young shrubs, or young trees. Naturally then, after a large flock of sheep have been driven over a stretch of country, they leave little or nothing in the way of vegetation behind them. What is not eaten is trampled down. In this way the useful herbage of large stretches of country has been destroyed, leaving objectionable weeds and undesirable plants to take its place.

On the mountain sides and in the forests the effect has been worse. Where the natural vegetation covering the mountain sides is destroyed, there is nothing to bind and hold the loose soil. Hence the heavy rains and melting snows wash away the soil and carry it into the rivers, thus filling up their channels and causing them to be too small to hold the volume of water coming down. The effect is inevitable. If the volume of water is too great to be confined within the river beds, it overflows the banks and floods the surrounding country, often with great loss of life and property.

In the early days, before it became necessary to utilize the timber of the forests on our

mountains, the grazing of sheep over the lands had little or no ill effects. The trees could not be harmed by the sheep, as they ate only the undergrowth. Where the grazing was excessive, the tramping of the sheep packed and hardened the soil to a harmful degree.

When, however, it became necessary to put the trees of the forest to economic use, the grazing of sheep on the cut-over lands became very harmful. As the sheep fed closely and ate practically everything in their path, they destroyed shrubs and young trees alike, and consequently no new forest growth could survive to take the place of the old trees which had been cut down.

After forest fires an undergrowth springs up, which makes a good feed for sheep. Certain unprincipled flock owners, discovering this fact, wantonly set fire to the forest lands in order to improve the pasturage for the following spring.

In justice to the flock owners and shepherds, it should be said that they were not alone guilty of this pernicious practice. The owners of vast herds of range cattle were also in the habit of driving their stock upon the unoccupied lands for free grazing. They too found how the burning process improved the feed, and they too resorted to it.

The effect was the same: the forests were destroyed and all the consequent evils followed. The mountain rains and melting snows cut away the soil and filled the rivers, causing floods. More than this, it is a well-known fact that tree growth and plant growth hold the water which falls as snow and rain, allowing it to enter the soil, to reappear again as springs and smaller streams below, and thus to flow off slowly and continuously throughout the season, instead of washing rapidly down the mountain sides, carrying soil and all with it. Without plant growth to retard them, the waters come rapidly and in immense volumes, overflowing our rivers and causing great floods. We have therefore a great flow for a short time, followed by a short supply later in the season.

In countries where there is little or no summer rain, irrigation has to be practiced to produce crops. Hence a continuous flow of water throughout the year is all-important. We have seen that the preservation of the forest growth on the mountain sides is necessary if a continuous flow of water is to be maintained. Hence the destruction of the forests by shepherds, cattle herders, or any other ruthless person destroys also the industries of the countries dependent upon the maintenance of a continuous water-supply.

Fortunately, the government authorities have realized the danger, and the evils of forest destruction are everywhere being studied, in order to find methods for their prevention. "Forest Reserves" have been created, in which no grazing is allowed except by special permit and limiting the number of animals which can graze without detriment to the forests. Our readers will see from this description how even so small an animal as a sheep may be the means of causing ruin and desolation to many farmers and settlers, if not managed with judgment and consideration of the rights of others.

The sheep maintained in vast flocks are kept primarily for wool. Some mutton sheep are produced, but they are not the primary object of the flock. There is also little or no attention paid to the breed. There is in a way a sort of natural selection or natural preservation. The sheep which cannot stand the hard, long drives and often the scant winter-supply of food perish, and thus only the hardiest ones survive and produce young.

The opportunities for a profitable carrying on of sheep raising on this large haphazard scale are growing less and less. The same may be said of extensive range cattle raising and all other farming on a very large scale. The area of unoccupied land is growing smaller and smaller; thus

the chances for free grazing are growing less. In addition, the careful breeding and feeding for mutton and for wool are becoming better understood. Thus we may reasonably expect, in the not far distant future, to see the replacing of the range system, to a great extent, by the farm-rearing and keeping of sheep.

About Wool

The sheep breeders of Saxony examine the wool of their sheep under a microscope, and only breed from those sheep whose wool is found to be the softest and most abundant. By this careful and scientific method the Saxon breeders have been rewarded by a breed of sheep yielding an abundant supply of the softest and most beautiful wool.

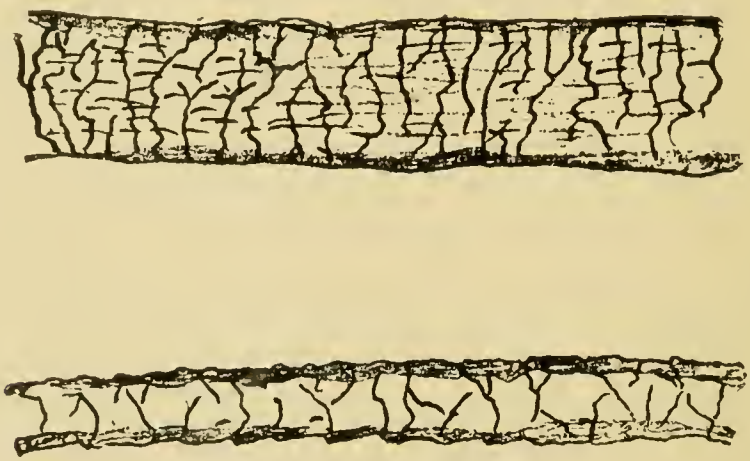
Sheep do not shed their coats at certain periods of the year like many other animals. The flock masters, however, tell us that at certain times of the year the wool or fleece lifts, or "is up," which means that a certain division between the wool and the skin takes place; then it is that the shears run easily and the labor of shearing is much lessened.

The lifting of the fleece is really caused by the fibers of the newest growth erecting themselves, and therefore slightly lifting the matted fleece.

If sheep are not well and wisely fed, the best wool will run back in quality, and therefore will not sell for the best price.

Our bodies are kept warm because our clothes prevent the warmth that is made inside our bodies from escaping into the air.

Wool is fine and open, and therefore holds a great deal of air amidst its fibers. It is this air,



WOOL FIBER (magnified).

practically, that prevents the heat of the body escaping, and so keeps the animal warm. Wool, therefore, is said to be a poor conductor of heat.

You all know that the wool of a sheep's back is manufactured into the woolen clothes which we wear.

There is something in the nature of the wool itself that helps the manufacturers to do this. Let us see what it is.

If you examine a fiber of wool under a magnifying glass, you will see that it is made up of

sections or parts, and you will also find on these fibers little joints or scales. So that when several of the fibers are pressed together these little joints or scales catch one another and so hold the fibers together — the wool, as we say, "felts" well. Here you have the principle of making woolen clothes.

Here is another interesting fact: From the skin of a sheep there comes a soapy substance called "yolk," which covers the under-wool and helps the animal to shed the rain. This keeps the body dry and prevents the wool on a sheep's back from felting. When the fleece is washed this yolk is washed out and the fleece becomes much lighter.

Notwithstanding this wise provision of nature, sheep cannot stand constant wet, either overhead or under foot, but they thrive best in cold, dry weather, on dry, well-drained soil.

When wool is taken to market, it will bring a better price if it is clean and put together in an attractive manner. It often happens that a good product brings a low price simply because of the untidy and slovenly way in which it is sent to market. This is true, not only of wool, but of all agricultural products. Those products which go to market with a neat, attractive appearance will almost always find a ready sale.

Breeds of Sheep

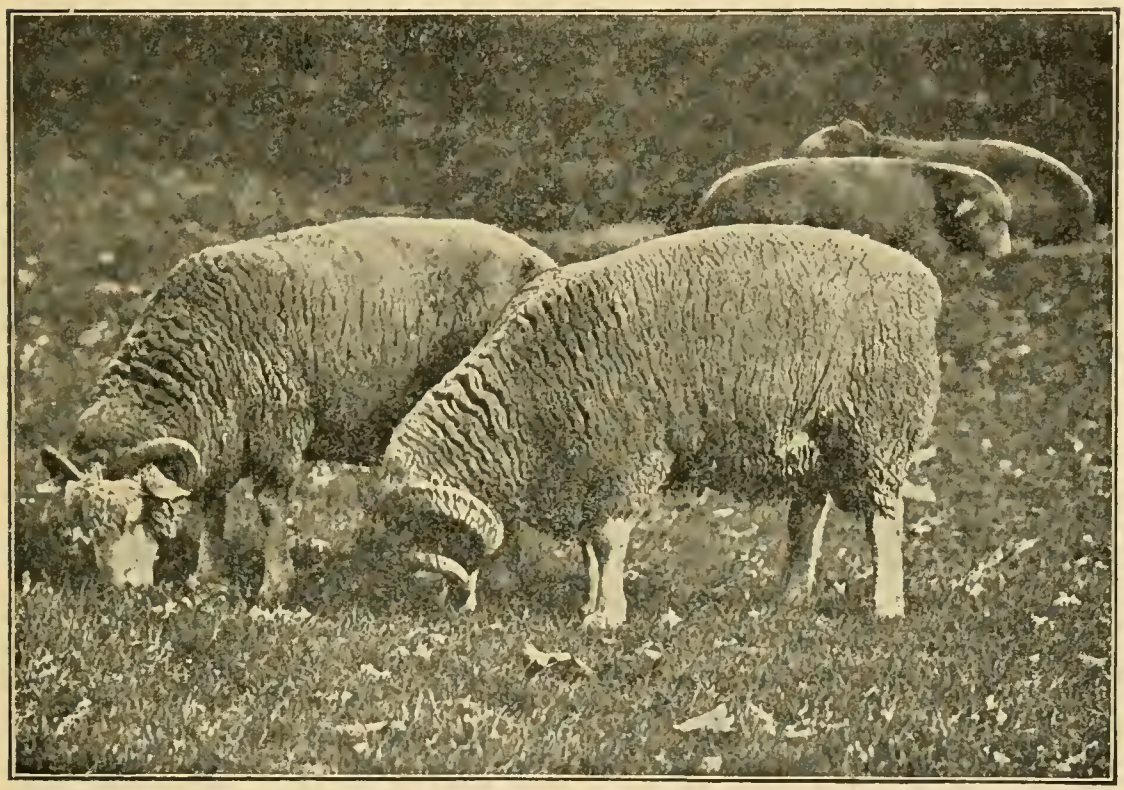
As has been said, there is no attempt to breed the range sheep of the Far West with any definite ideal in view. On the other hand, the sheep which are kept as farm animals are carefully bred and fed, and only those animals which approach the ideal of the breeder are preserved and bred from.

The breeds of sheep may be divided, for convenience of description, into three classes: short-wooled, middle-wooled, and long-wooled. In the first class are included the different varieties of Merinos, the Horned Dorsets, and the Cheviots. The second class includes the Southdowns, Shropshires, Hampshires, and Oxfordshires. In the third class are the Cotswolds, the Leicesters, and the Lincolns.

The Merinos

This is the breed of sheep which enabled Spain at one time to control the wool markets of the world. Merinos existed as a distinct race of sheep two thousand years ago. Just where the breed originated it is impossible to say with certainty. We may be sure, however, that the Merino is the oldest breed of sheep in existence, and all indications point to Italian and African animals as their ancestors.

On account of the far-famed excellence of their wool, Merino sheep were sent to almost every country of the world, including America. The first importation into our country dates back to 1791, but it was not until 1802 that



MERINO SHEEP.

an importation of importance was made by Colonel David Humphreys, then Minister to Spain. From this flock, together with a second importation made in 1809–1810 by Colonel Jarvis, the several types of American Merino sheep have been developed.

These American strains of Merinos have arisen from the fact that the original flocks were di-

vided and sent to different parts of the United States. The various conditions, climatic and otherwise, which prevailed in the different portions of the United States had the effect of bringing about differences in the characteristics of the representatives of the breed. The different breeders who reared the sheep in several portions of our country undoubtedly had different ideals. Thus it was that the principal American strains of Merinos, known as the Atwoods, Dickinsons, Black-Tops, Delaines, and Paulars, came into existence in the United States. The animals of these several families differ very much in appearance.

The Merino sheep weigh when mature from 100 to 125 or 130 pounds. They vary in color or rather in shades of color. They are woolly almost down to the tips of their noses and down to their hoofs. The ewes are hornless, but the rams have well-developed, light-colored horns. Another original characteristic of the Merino was a very much wrinkled skin, which gave the sheep the appearance of being fitted with a coat very much too large for it, and which in consequence hung in long folds and wrinkles. This wrinkled skin has, however, been wholly bred out in the Dickinson, Black-Top, and Delaine families, so that the animals of these strains present a smooth appearance.

Horned Dorsets

This breed takes its name from the shire of Dorset in England, where these sheep have existed for a considerable time. The breed is further designated as "horned" on account of the fact that both rams and ewes have well-developed horns. The old Dorsets resembled the old Spanish Merinos, so it was at one time thought that they originated from the Merino. The resemblance, however, was only in form. The characteristics of the two breeds are wholly different.

In the first place the Dorsets are very different in their appearance. While the Merinos are woolly almost to the tips of their noses and toes, the Dorsets have smooth faces and legs. There is a tuft of wool on top of the head, and on the legs there is no wool below the knees. The faces and legs are white. Both ewes and rams have horns. The fleece is rather short and not so fine as the Merino. In high-class flocks, the average clip is from 6 to 8 pounds of wool.

The special characteristics of the Dorsets are their early maturity and fattening qualities.

The Dorsets are not as well known in the United States as some of the other breeds of sheep.

Cheviots

The Cheviot sheep take their name from the Cheviot Hills or Mountains, situated in the north of England and extending into Scotland, where the breed originated. How it originated or where it came from nobody seems to know. There is a tradition that the progenitors of the Cheviots escaped from the wreck of the Spanish Armada by swimming ashore, but there is nothing to prove this.

The Cheviots were first brought to America in 1840, but they have not been distributed over our country to any great extent. The largest flocks are in New York and Indiana.

The Cheviots have smooth faces and legs, which are mostly white, and they possess no horns.

The fleece is short and the wool of only medium fineness. Scotch tweeds and cheviot cloths are manufactured from their wool.

As the fleece is short, and the wool comparatively coarse, and as the average weight of fleece of high-class animals is only from 3 to 5 pounds, the Cheviots are not rated as a high-class wool breed. But the mutton is of a superior quality. These animals are well adapted for use in the mountainous regions of the West. They fatten well on root crops, after feeding on pasture.

Southdowns

This breed takes its name from the grassy slopes of the chalk hills which are situated in southern England, and which are known as "Downs." In contact with the range of low, chalky hills is a stretch of low cultivated

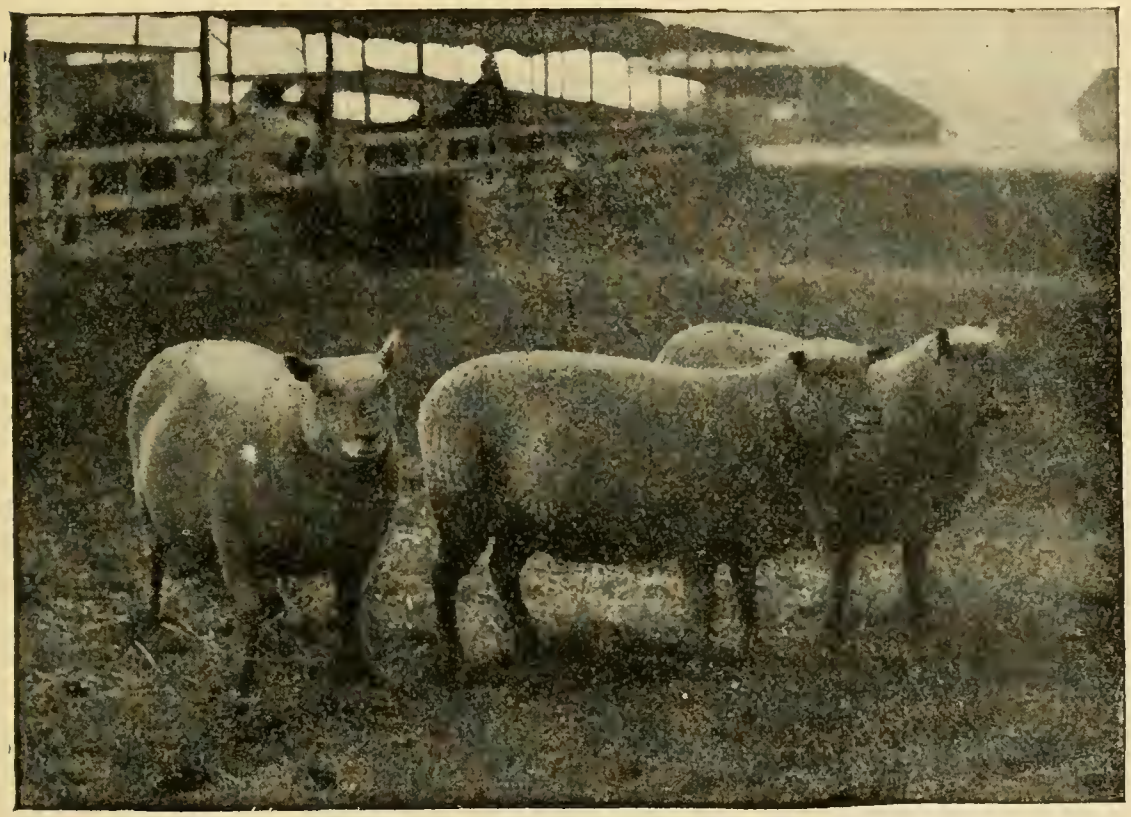


Photo. Charles Reid.

SOUTHDOWN SHEEP.

land, which yields a large amount of low, short herbage, very well adapted for sheep feeding. And sheep in immense numbers have been maintained on these lands for long periods. The elevated land and mild climate of the region, together with the rich herbage produced on the

cultivated lands, give a combination of favorable circumstances which render possible the keeping of sheep in large numbers, and at the same time have afforded the breeders the opportunity of using artificial or cultivated feeding in the improvement of their flocks.

Although the original Southdowns were not superior to other sheep of the same locality, the combination of favorable climate and soil, together with careful selection and feeding, has produced a breed of sheep most esteemed in the countries suited to them.

The mutton of the Southdown sheep is of the finest quality, the sheep are hardy and easily kept and fattened, and in addition the wool is of good average quality. This combination of qualities makes the Southdown a good general purpose sheep, especially so where mutton is the primary object, with the production of wool as a secondary consideration.

Next to the Merino, the Southdown is the most widely and favorably known sheep in the United States. In the Western and Middle States the breed finds its greatest popularity.

The Southdowns have smooth faces and legs, with tufts of wool on the forehead and cheeks. The color of the smooth face and legs is a uniform tint of brown, gray, or mouse-color. The Southdown is a hornless breed. The fleece is

white, compact, and close, with a rather short and curling staple. The average clip of good flocks is from 3 to 4 pounds, and in high-class flocks from 6 to 7 pounds.

Shropshires

This breed of the middle-wooled class somewhat resembles the Southdown, and like it has

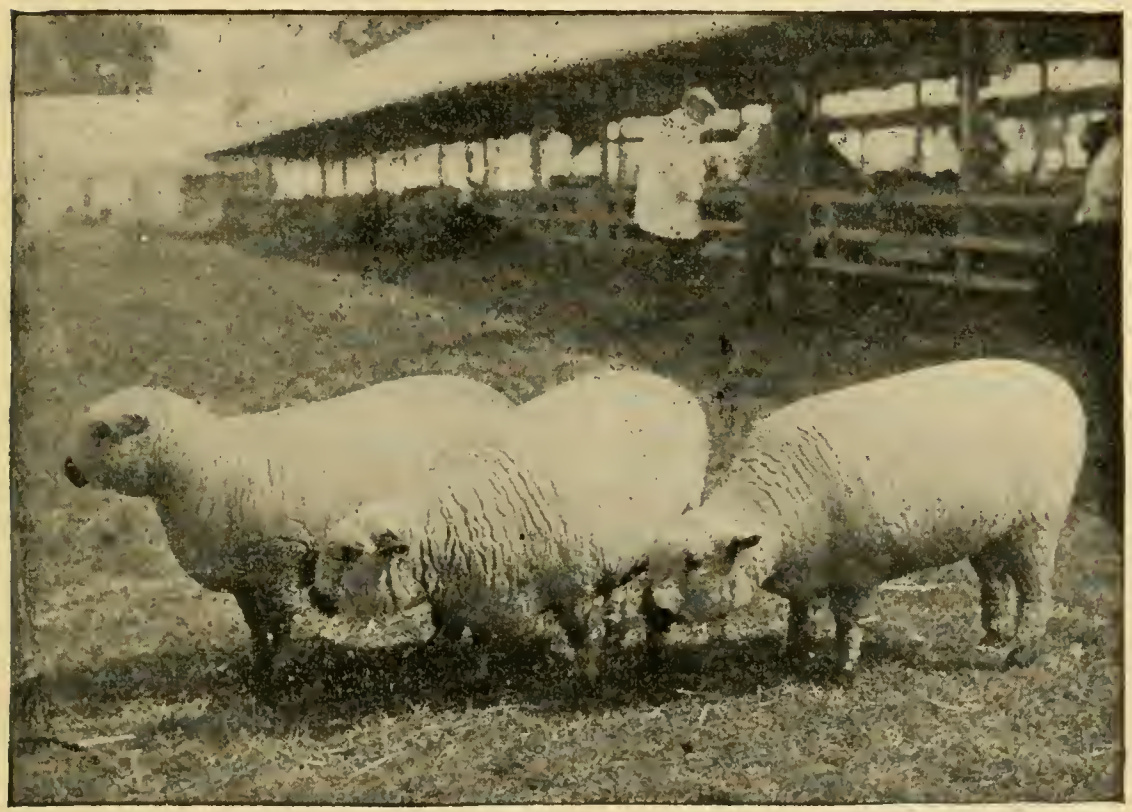


Photo. Charles Reid.

SHROPSHIRE SHEEP.

become a great favorite in the United States. Shropshires were first imported into America in 1855.

The Shropshires are larger than the Southdowns, averaging from 175 to 225 pounds in

weight when fully mature. The wool is closer set, finer, and longer in the staple than is that of the Southdown. The head is well covered with wool down to a line below the eyes. The smooth portion of the face is dark gray or brown. The breed is without trace of horns. The legs are well covered with wool down to the knees. Below the knees they are smooth and very dark brown — almost black — in color.

Shropshire sheep came to us from England, where they are in great favor. As mutton sheep they produce larger joints than the Southdowns, and the meat is nearly equal in quality. With good care they are marketable at from 11 to 14 months old. The yield of wool averages about 7 pounds per fleece in high-grade animals.

In England, Shropshires are found to thrive under varied conditions of soil and climate.

Hampshires

This breed originated in the chalk hills of Hampshire, England, and it is said to be the result of the interbreeding of the old Wiltshire and native Hampshire sheep with the Southdowns. Hampshires were imported into the United States prior to the Civil War. The largest flocks of Hampshires were kept in

the South; but during the war they were practically exterminated. Since the war, however, importations have been made, and it is claimed that they surpass even the Southdowns in the ease and rapidity with which they become acclimated to the peculiar conditions existing in our Southern States.

The Hampshires are the largest of the so-called "Downs" breeds proper. They have the Downs characteristics: dark face and legs, and no horns. The head is large, with the wool not extending so far down as is the case with the Shropshires. There is also a decided appearance of a Roman nose in the Hampshires, and the color of the face and legs is very dark, nearly black.

The wool is longer than that of the Southdowns, and coarser in texture; but, considering the greater size, the Hampshires do not average as high in wool production as do the other Downs breeds. The average yield from high-class animals is from 5 to 7 pounds.

The strong characteristic of the Hampshire breed is the rapidity with which the lambs come to marketable size, and in this respect the breed is probably without equal. The lambs frequently increase from 15 or 16 pounds at birth to 140 or 150 pounds at 7 or 8 months old, a really remarkable showing.

Oxfordshires

This breed really stands between the "Downs," or middlewools, on the one hand and the long-wools on the other, although it is usually classed among the middlewools. It takes its name

OXFORDSHIRE SHEEP.

from the shire of Oxford in England, where the best flocks were reared. The breed originated about 1830 by crossing the improved Cotswold with the Hampshire, and also mixing the cross with the Southdown to at least a small extent. The wool is more like the Cotswold in its combing quality, while the dark face and legs show the evidence of the Hampshire influence.

The Oxfords have smooth faces and legs, which are dark brown or grayish in color. They have a tuft of wool on the forehead standing out well from the head; otherwise the head and face are smooth.

The wool averages about 5 to 7 inches in length and is not so long as the Cotswold, but with the same tendency to curl. It is finer and closer than the Cotswold wool, and stands out well from the body. The average yield of high-class flocks is about 7 pounds.

The Oxfordshire is a good, dual purpose sheep. The body is well rounded, legs short, while the weight is good, and the yield of wool is satisfactory. Mature animals run from 200 to 275 pounds in weight, but sometimes the latter figure is exceeded.

Owing to the fact that the Oxfordshires' original home was at the base of the Cotswold Hills, where the land is damp and springy, they are better able to bear moist situations than any other breed of sheep.

Cotswolds

This is one of the very old breeds of sheep, and in consequence its characteristics are firmly fixed. The Cotswold is known to have existed in England during the thirteenth century, and how much earlier it is impossible to say. During

the thirteenth century Cotswold wool was known and valued in England, and even at that period had a place in the wool quotations.

The breed was later improved by the introduction of Leicester stock, which has given it finer

COTSWOLD SHEEP.

mutton qualities without injuring the hardy constitution of the old Cotswold stock.

Cotswolds were probably first brought to America about the year 1840, and since that time the breed has become widely and favorably known in our country as an excellent mutton and wool sheep.

The color of the Cotswolds is white. The face and head are smooth, with the exception of

a long forelock of curling wool which hangs over the forehead. The smooth face and the legs below the knees are white or light grayish. The breed is hornless. The wool is very long, 8 to 10 inches, pure white, and the fleece averages from 10 to 16 pounds in weight.

The Cotswold ranks among the large breeds, ranging from 250 to 375 pounds in weight. In old sheep of this breed the mutton is coarse and not of high quality; but when butchered under two years of age, the quality of the meat is fairly good.

Leicesters

The Leicesters take their name from Leicestershire, England, where the great English breeder, Robert Bakewell, lived and originated the so-called New Leicester breed.

The Leicesters were intended primarily for mutton; wool, with Bakewell, was a secondary consideration.

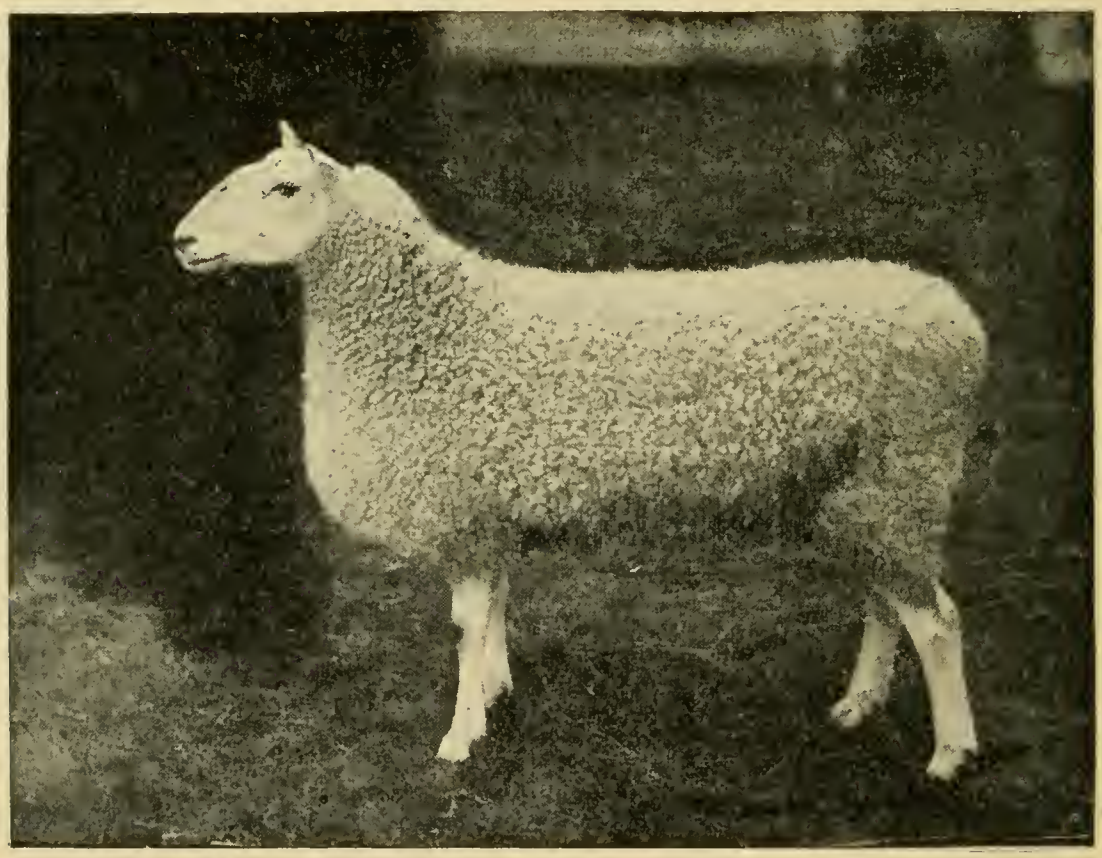
This breed was known in America prior to the Revolutionary War. Although Leicester sheep were at one time the prevailing breed in New York, they have never gained a foothold in the West or South.

The face and legs are smooth and white. In some of the representatives of the breed the entire head is smooth, but as a rule there is a tuft

of wool on the forehead, which, however, is not as long or as large as the Cotswold's. The breed is hornless.

Early maturity and easy fattening qualities are characteristics of the Leicesters. Mature representatives of the breed average from 190 to 225 pounds in weight.

The Leicester fleece is classed with the long or combing wools, averaging in length from 6 to



BORDER LEICESTER SHEEP.

10 inches, and high-class flocks yield, on an average, from 7 to 9 pounds of wool.

The ewes cannot be accounted good mothers. The lambs are tender, and require extra care

in rearing them. Pure-bred Leicester sheep are, therefore, adapted to only comparatively few parts of our country.

There is a variety of the Leicester breed in the south of Scotland and north of England, and which has been given the name "Border Leicester" on account of its being bred in the border counties. The main points of difference are the larger size, a more pronounced "Roman" nose, and a head whiter and clearer of wool; all these differences may be attributed to the differences of climate and methods of handling in the border counties.

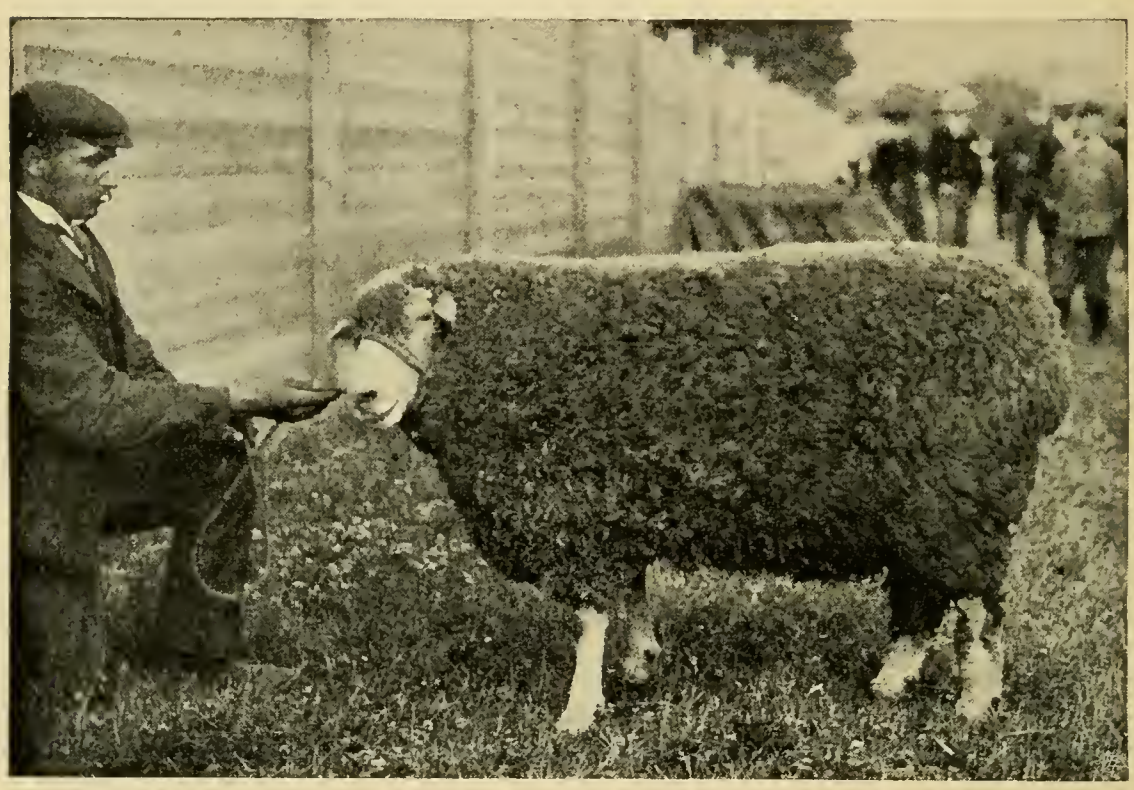
Lincolns

Lincoln sheep came to us from the lowlands of Lincolnshire and other eastern counties of England. The breed is a very old one, and, like the Leicester, has been improved in modern times. The original Lincoln was a large, gaunt animal, which, requiring a large quantity of food, possessed poor fattening qualities. The improvement is said to have been brought about by the intermixture of Leicester blood.

The color of the face and legs is white, and there is usually a conspicuous absence of wool on the forehead. The fleece is the longest of the longwools or combing-wool breeds, averaging

from 9 to 12 inches in length of staple. These sheep are hornless.

In size, the Lincolns may be classed among the largest of modern breeds. Mature ani-



LINCOLN SHEEP.

mals average from 225 to 250 pounds in weight, and there are records of animals fattened for exhibition purposes weighing 323 pounds.

The Lincoln requires rich food and plenty of it, but where suitable conditions abound, it is one of the most profitable sheep, both on account of its meat-producing qualities and on account of the weight and quality of its fleece.

Care and Feeding of Sheep

On account of the large area and varied conditions of the soil and climate of our country, it is impossible to do more than to refer, in a very general way, to the care and feeding required by sheep in America. Sheep are successfully raised in all sections of our country: in the Eastern or Atlantic States, with their worn-out soils and severe winter climate; in the great Middle West or Plains region of the valley of the Mississippi River, where the fertile soils produce enormous crops of the most excellent forage plants; in the Southern or Gulf States, with their hot, humid summers and mild winters, where cotton-seed refuse forms a large portion of food for live stock of all kinds; in the Far West, where almost all conditions of soil and climate prevail, including arid plains as well as high mountains, but where almost without exception, alfalfa is available either as hay or pasturage. It is in this last-named region where free ranging is practiced on so large a scale.

The foods obtainable and the methods of treatment must naturally be very different over so wide a stretch of country.

The sheep industry has changed in the United States during the past few years. At one time millions of sheep were kept and ranged in the

great West solely for wool production. With the decline of the price of wool, however, many flocks were sent to market, and those which remained were kept not for wool alone, but also for mutton. It was soon found that the demand for mutton was increasing, and hence the production of the mutton sheep became profitable. There is now, therefore, more system in the management of the range flocks. Provision is now made for caring and feeding during the winter, where it was unheard of a few years ago.

The introduction of the silo has been of great importance in developing the sheep industry. The silo is a large, air-tight compartment or building, where chopped green feed can be stored and preserved for use during winter or during dry, arid seasons. The food so stored is called "ensilage," and by its means live stock can be given a supply of fairly good green food practically the year round.

The extension in our country of the successful cultivation of alfalfa is a great boon to live stock of all kinds. Formerly it was thought that this prince of forage plants could only be grown in our Pacific Coast States, where irrigation is practiced. But now, by the introduction of new varieties and different methods of treatment, the raising of alfalfa has been extended

to many of the Middle Western and Southern States.

In sheep raising, as with all branches of farming, painstaking and systematic care and management are the price of success. More and more, as time goes on, the old, haphazard methods and the prejudices and "notions" are being found unprofitable, and the introduction of modern scientific methods is replacing them to a marked degree.

From a number of accurate experiments we now know the chemical constituents of foods and the quantities to feed for the most satisfactory economic results. For example, it is a bad plan to feed sheep wholly on turnips, because turnips are a very watery food. Ten pounds of turnips contain nine pounds of water.

Therefore, if sheep are to get enough solid food from turnips, they are compelled to eat a larger bulk of food than they require.

Remember that the great principle in fattening all live stock is to give such food that, while keeping them healthy, it will be turned into the best quality of bone and meat without overloading the digestive organs of the animal.

Turnips, if they are fed, should be combined with other and more concentrated food, so that the animal will be nourished with as little waste of energy as possible.

In selecting sheep for any particular purpose or for any portion of our country, care should be exercised in the selection, so that the breed or breeds chosen may prove adapted to the climatic and other conditions of the locality, as well as for the requirements of the markets. This is now a comparatively easy matter, for owing to the work of the National Department of Agriculture and the various State Agricultural Experiment Stations there has now been accumulated a knowledge of the different breeds of animals suited for the different localities, and this information can be obtained by the farmer on application to the proper authorities. There are also many books on the subject, written by men who have made special studies of the numerous problems pertaining to our agriculture.

Diseases

In all parts of our country, sheep are afflicted with what is known as "scab." Scab is produced by a mite, which bores its way into the skin of the sheep, producing great itching and finally resulting in great patches of scab on the skin. The wool drops off from the affected spots, thus the quantity of wool produced by the animal is reduced. In addition, the sheep is annoyed to such an extent that it loses flesh and becomes unsalable. The mites

may spread from one sheep to another, and thus whole flocks may be affected. In fact, it is said that one reason for the scarcity of the wild sheep of our mountains is the fact that they have become infested with the scab mites from the flocks of sheep pastured on the ranges, and as no means for controlling the mites exist in nature, the wild flocks have become decimated by their ravages.

In order to get rid of the scab mites, the sheep must be dipped in a solution containing some substance which will destroy the parasites. There are a number of "sheep-dips" manufactured and sold, practically all of which have as a basis some creosote-like substances.

In damp lands, or where the sheep constantly have their feet in moist or wet soil, a disease called "foot rot" is common and exceedingly troublesome. Sheep are not adapted to damp lands, and for that reason their pastures should be naturally dry or well drained.

In our Southern States, sheep are afflicted with "nodular disease," caused by an internal parasite, — a small worm, which is picked up in infested pastures, and which produces nodules in the intestines. The disease is especially fatal to lambs. There seems to be no way of treating the disease or dislodging the parasites after once they have gained an entrance. The only remedy

is a preventive one, and consists in changing the pastures, so that the parasites may not be carried from one animal to another. If no sheep are allowed to graze on the infested land for a period of a year or two, it may become free from the parasites giving the disease. It has been found that they are spread only by being picked up by the sheep while feeding.

Some breeds are at least partially resistant to the disease; and always, it should be remembered, a vigorous and healthy animal is better able to withstand any attack of disease than is one of low vitality. Aim always, therefore, to keep the animals of the flock in the best condition.

Sheep should have always at hand a plentiful supply of *clean* water and rock salt.

Care, patience, and systematic management will enable a man to succeed, where otherwise failure is inevitable.

CHAPTER VI

THE GOAT

Wild Goats

The goat has been so long in domestication that it is not definitely known what species of wild goats was the original stock from which our domesticated goats have developed. Naturalists do not agree on this point, but the majority think that a species of wild goat existing in Persia and known as the *Paseng* was, as nearly as can be determined, the type of animal from which our common goats have descended.

Of one thing we are certain, however: that the original wild goat lived on high mountains, amongst precipices and broken crags. We are supported in this belief by the fact that goats are proverbially agile climbers, and are so constituted that they are able to subsist upon the coarsest kind of herbage, scanty and coarse grass, fallen leaves and twigs.

The goat is more of a browsing than a grazing animal — that is, it selects the leaves and twigs of bushes, shrubs, and small trees for its

food, in preference to low-growing grass and herbs. Goats are not at all particular in the choice of their food, so far as flavor is concerned. They will eat anything and everything, no matter how acrid or aromatic the flavor. The goat and the ass are very similar in this respect, for

THE WILD GOAT.

both are browsing animals, and are able to subsist on scant and coarse food. These animals will thrive on rugged mountains where the food is so scarce and coarse that any other farm animals would starve. Goats will eat almost anything, — leavings, bits of straw paper, even rags,

waste from the garden, trimmings from hedges, bits of tobacco and cigar ends, wormwood, red peppers, or any other vegetable substances which no other animal would touch.

It is supposed that the wild goats in order to preserve the race were compelled to cultivate a taste for coarse and aromatic food of all kinds, or perish. Most of the herbage which was available for their food in their native countries was aromatic, and often acrid and bitter. Therefore it follows that only those goats which could thrive amidst these conditions survived, while those which were unable to do so, perished. In this way a strain of animals has developed, which could subsist on highly aromatic plants, and the leaves and twigs of bushes. This taste and the ability to live on such herbage have been inherited by our present-day goats.

On account of the severity of the climatic and food conditions under which the wild goats had to exist only the hardiest could survive, the result being that goats are proverbially hardy, being able to withstand all kinds of climate as long as they are not subjected to very damp conditions. Moreover, goats are peculiarly free from diseases which afflict many other domesticated animals. They have inherited this freedom from disease from their hardy mountain ancestors.

In consequence of the scantiness of the food supplies in the native places of the wild goats, they had to roam over large stretches of country in order to get enough to eat. Our domesticated goats have inherited this wandering characteristic, with the ability to subsist on coarse and scanty food. They have also inherited from their ancestors extraordinary powers of climbing and jumping, together with very strong nerves and rare presence of mind. It required all of these qualities to enable the wild goats to exist amidst the lofty crags and precipices of their native home.

These rare qualities of steady nerves and strong presence of mind which our domesticated goats have inherited, are often put to good use, as we shall read later on.

Sheep, oxen, pigs, and horses on being frightened will easily lose their heads, be seized with a panic, and gallop wildly about; but not so the goat.

There is nothing that terrifies a horse more than a fire. So paralyzed with fear does the poor beast become, that if his stable is on fire while he is in it, as a rule he has to be blindfolded before he can be led out. So when fires were more numerous than they are now, it was the custom to keep a goat in the stable, because in case of fire the goat, with his steady nerve

and presence of mind, might give the lead out of the burning stable to the frightened horses.

Cattle have a horror of the butcher's slaughterhouse. They seem to have the power of smelling the blood. So butchers have at times great difficulty in inducing the animals to enter their premises. Many of them therefore keep a goat that will give a lead and restore confidence to the frightened cattle.

On the vast ranges of the West where sheep are kept in flocks of 1000 to 3000 or more, the sheep are liable to be stampeded by the attacks of wolves or coyotes. The shepherds have learned that the presence of a few goats gives confidence to the sheep. The goats will make desperate efforts to defend themselves when attacked, and will often either frighten the attacking animals away, or even hold them at bay until they can be driven off or killed by the flock tenders. The sheep soon learn to depend upon the steady-headed and plucky goats, and when attacked at night the flocks will huddle around them for protection, instead of stampeding in fright.

Intelligence and Climbing

Goats are possessed of great intelligence, and this intelligence has been utilized to unload cattle ships. They will go to each part of the

ship where the cattle or sheep are penned, and lead the way over the gangway. And you all know how readily sheep will follow a leader.

In consequence of the wild goat living its life on the heights, it has developed wonderful powers of sure-footedness. Where a sheep will jump, a goat will clamber; hence some of the differences in shape between a leg of mutton and a leg of goat.

To enable the sheep to jump, the muscles of the leg are full and large.

To enable the goat to clamber, the muscles of the hind legs are lean and tight.

To show the great natural intelligence of a goat, it is recorded on the best authority that two goats met on the narrow ledge of a precipice, where there was no room for one to pass the other; so one goat deliberately lay down while the other goat stepped over him. That was a piece of intelligence, a bit of reasoning of a high order, and adapting of a means to an end. The means was the lying down of one goat so that the other goat might step over; the end, the goats continuing their journey without harm to themselves. It also proved the wisdom of mutual help, for had they fought for the possession of the narrow ledge, the probabilities are that both would have lost their lives.

To show you the extraordinary climbing

power of a goat, one careful observer says that he once saw a pair of kids running races up and down the shafts of a disused farm roller, tilted at an angle of 45 degrees. When they reached the extreme end of the shaft, lifted high up in the air, the steady-headed little creatures would bring the tips of their little hooflets so close together that they could almost have rested on a penny, and then very slowly turn themselves round, as on a pivot, and slowly descend the shafts.

By noticing the habits and doings of our domestic animals, what they eat, how they eat, their natural attitudes and ways, their little tricks, we are often able to learn what the surroundings were like amongst which their wild forefathers lived before they were domesticated by man.

For instance, the steady nerves of the ass and the goat tell us that their ancestors must have lived where the surroundings called for the keeping of a cool and steady head.

What conditions would more demand the constant exercise of a steady nerve and head than life amidst mountainous regions?

We know that the ass is fond of thistles, and that the goat is fond of strong, pungent flavors. Both animals will thrive on food upon which other animals would starve; both are very

hardy and of a good constitution, seldom requiring the veterinary surgeon.

These are the conditions, the surroundings that exist, wherever the wild representatives of the ass and the goat are found.

The Uses of Goats

Goats may serve three very useful purposes: they may be kept for their skins, of which there are nearly seventeen millions imported into the United States every year; they may be kept for their yield of milk to be used for household purposes or for the manufacture of special kinds of cheese, such as Roquefort cheese; or they may be kept for their fleeces of hair.

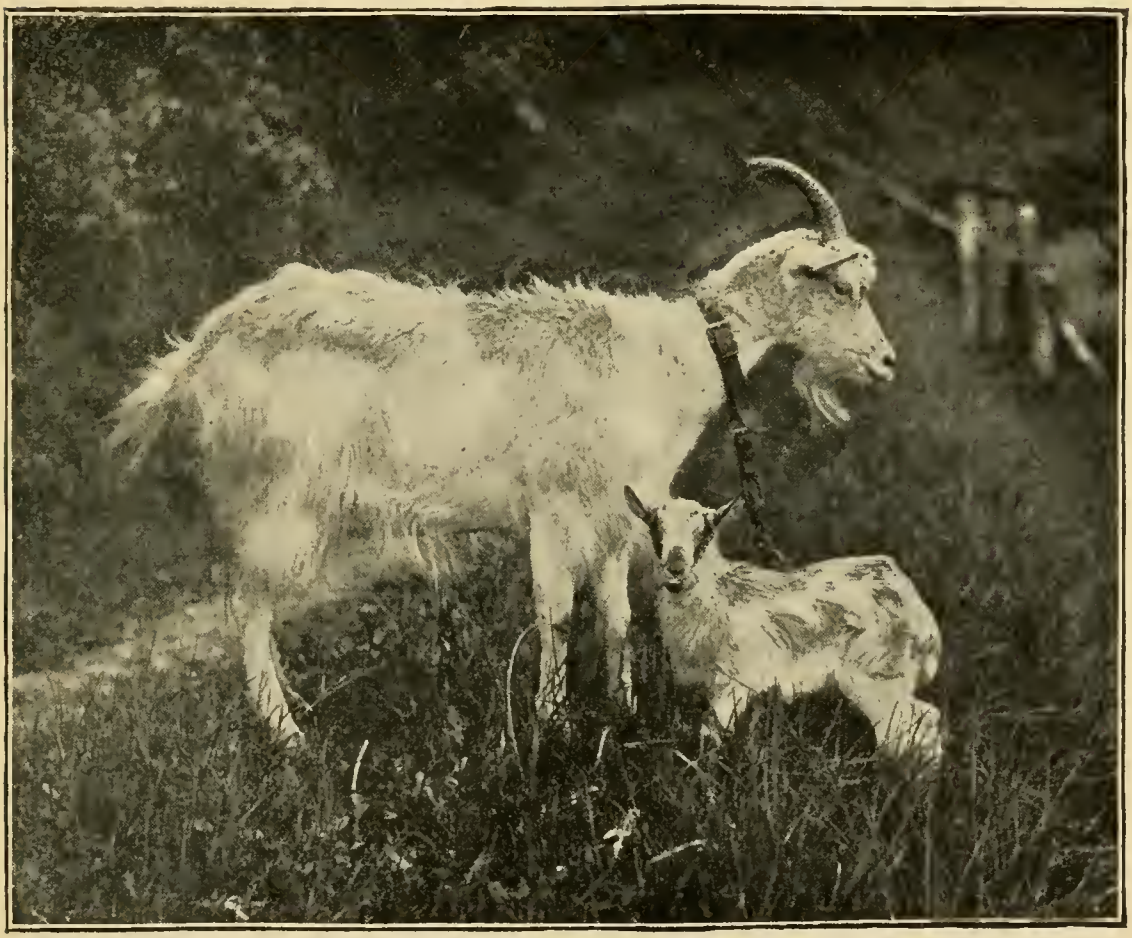
There are, as yet, comparatively few goats kept in the United States for their skins alone, although this could be made profitable on some of our lands which are too poor for the production of farm crops.

In the suburbs of some of our large American cities, goats are kept for milking. These animals require little or no care, finding most of their food about the streets and roads; and thus they serve a very useful purpose in supplying rich, fresh milk to young children who would otherwise be deprived of this life-giving nourishment. For this reason the goat is often called the "poor man's cow."

Goats' milk is more easy to digest than cows' milk, and is therefore very valuable for children and invalids.

It is light, sweet, rich, and nourishing, not so heavy as cows' milk, but like it in flavor.

Of course the quality of the milk yielded by goats varies with the kind of animal and the



GOAT AND KID.

food which it eats. The goat is no exception to the rule that the best-bred animals must be kept if one expects to obtain good results.

The goats kept for dairy purposes in the

United States are mostly selected from common strains, and bred especially for milking purposes. The most profitable goats are of a dark color, with hard, stiff hair, not too great in quantity, with small heads and form of neck resembling that of a sheep. As a rule, hornless goats make the best milkers.

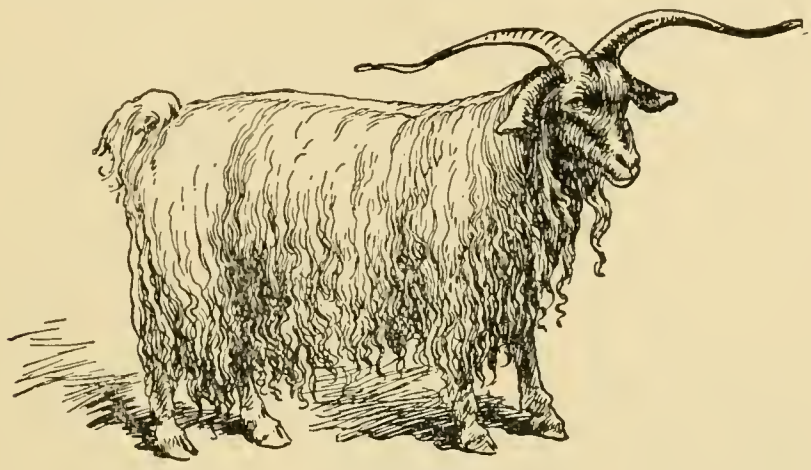
Dairy Breeds

There are special dairy breeds of goats. The best known of these are the Nubian, Bengal, Chinese, and Maltese. These breeds are practically unknown in America, although they are used to a large extent in France and Switzerland, and to a small extent in England.

The Nubian and Bengalese goats are excellent dairy animals. But they are suited only to warm countries, as they cannot stand cold or exposure. Some of these goats give as much as a gallon of milk per day. In Malta the entire milk supply for a population of 170,000 inhabitants is yielded by goats. In these hot countries the goats are led around from door to door, and the milk which each householder requires is taken from the animal — a very effectual method of making sure that one obtains fresh and unadulterated milk.

Fleece Breeds

The goats which are bred and maintained for their fleeces are the Cashmere and the Angora. The Cashmere goat yields only a few ounces of soft, downy wool, from which the well-known Cashmere shawls are made in India. These



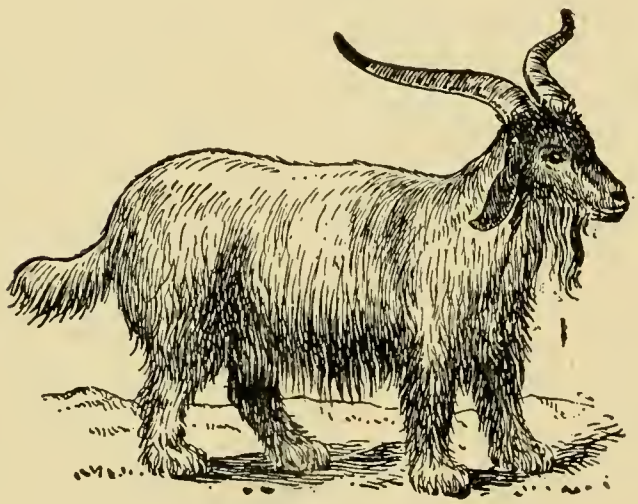
ANGORA GOAT.

animals are therefore valuable only in the locality where their wool can be utilized. They are not at all suited to American conditions.

The Angora goat, however, yields a fleece of long, silky hair, known as "mohair," and the average production per animal each year is about five pounds. The uses of mohair are increasing, hence the demand for the fleeces of Angora goats is steadily growing. Moreover, these goats may be bred and kept successfully in a great many sections of our country. They seem to be able to stand both extremes of heat and cold, provided they are not exposed to damp conditions.

The number of Angora goats is steadily increasing in the United States, and flocks are now kept successfully in practically every state of the Union. The Pacific Coast and the Southern States, however, seem to have the advantage, because of their favorable climatic conditions and the existence of large areas of waste lands which are ill suited to the cultivation of crops.

The Angora was introduced into America from Turkey in 1849. Two years prior to this, a Dr. Davis was recommended by the President of the United States to the Sultan of Turkey to assist the Turks in experimental cotton culture. So well did Dr. Davis perform his duties that the Sultan, as a mark of appreciation, presented him with nine Angora goats, which he brought to the United States.



CASHMERE GOAT.

Other importations of animals followed from time to time, until in 1881 the exportation of Angoras from Turkey was absolutely prohibited by the Sultan. This prohibition is still in force. Notwithstanding the Sultan's edict, a Dr. Bailey,

of San José, California, went to Asia Minor and managed to secure and ship four animals to the United States. These were brought to California and formed the foundation of the Bailey herd of Angoras, which has supplied animals for breeding purposes to all sections of America.

As we have mentioned above, the Angora goat is bred especially for its long, silky, and curly fleece of hair, which in commerce is known as mohair. In connection with wool, silk, and linen, mohair is manufactured into a great many fabrics, — ladies' goods, linings, plushes, astrachan cloth, furniture coverings, curtain materials, knitted goods, fancy effects in shawls, dress goods, and many other useful textiles. One kind of goods known as "camels' hair cloth" is not, as is ordinarily supposed, composed of hair from the camel. This cloth is made wholly from the fleece of the Angora goat. The name camels' hair in all probability is derived from the Arabian word "Chamal," which the Arabs apply to the Angora goat.

We have seen that the wool of the sheep "felts" together — that is, the fibers cling together by means of fine, spurlike scales, and thus form what we know as felt. Mohair fibers do not have these scales, and therefore possess no felting properties. This is one of the differences between sheep's wool and goat's hair.

In addition to the long, silky, and curly mohair, all Angora goats bear another kind of hair which is stiff and coarse, and which is known as "kemp." This kemp is undoubtedly the survival of the stiff hair of the common wild goats.

The larger the proportion of kemp present in the mohair, the less valuable it is for manufacturing purposes.

This is due to the fact that the kemp hair is not affected by the dyes which are used to dye the cloth, and therefore if it is present in the manufactured cloth or plush, it remains uncolored and shows up as dirty white specks. The manufacturer must therefore comb out the kemp. This is not only an expensive process, but it destroys a great deal of the good mohair.

It therefore follows that the more kemp there is amidst the mohair, the less price will the bulk bring.

It can be used only to make the cheaper fabrics, such as rugs, horse blankets and cheap blankets, and low-grade goods generally.

There is a large and increasing demand, at paying prices, for the best mohair; but the low quality hair does not bring a price which will pay for its production. As with mohair, so with everything else: market the best, and it will pay you; but send an inferior quality to market, and it will seldom pay the cost of producing it.

While the Angora goat has no claims as a dairy animal, its milk is very nourishing and wholesome. The milk is produced in small quantities, but it is richer than cows' milk.

The Angora hide is inferior to that of the common goat for the manufacture of leather. But the skins when tanned with the hair on make excellent rugs and carriage robes. There is a growing demand for the skins for this purpose.

In addition to all these uses, Angora goats are exceedingly useful in clearing land of brush, young shrubs, and weeds. Some farmers find it profitable to keep Angoras for this purpose alone. They are all-round feeders and seem to avoid that kind of vegetation which is required by other farm animals. Every leaf and every twig within reach is greedily eaten, and even many weeds and shrubs which are either poisonous or injurious to other stock are devoured with impunity by Angoras. They will desert the finest clovers and blue grass for the coarser foods.

Not only are the brush and weeds effectively cleared away, but the goats will keep them down until eventually they die out. While thus effectively clearing the land, the droppings from the goats form very valuable manure, so that the ground is placed in the best possible condi-

tion for the growth of nourishing grasses and forage crops.

The Angora goat has not the disagreeable odor which is so objectionable in the common goats. The flesh is delicate and nourishing, and much resembles venison in flavor. In fact, it is said that one can hardly detect the difference between the flesh of the Angora goat and the flavor of true venison. It is proposed to give the Angora flesh the name "Angora venison" in the markets.

In Chicago the use of Angora goats in the great slaughter pens and packing houses is steadily increasing. In the mountainous districts of California, miners prefer Angora flesh to mutton for salting down for winter use, because it contains less fat, keeps better, and is just as palatable.

Hard, dry, rocky situations are best suited to Angora goats. In wet, marshy ground they soon contract the deadly and disagreeable disease known as foot rot. On lands devoid of stones the goats' hoofs must be trimmed from time to time, as otherwise they will grow to great length and hinder the animals in walking. In rocky situations the stones and rocks wear away the hoofs as they grow, and so no trimming is necessary.

The fleece is supposed to be of finer quality in

cold climates and mountainous districts than in warmer regions. But it has been found by experiment that the quality of the hair can be very largely influenced by breeding, feeding, and care. In mountainous districts the presence of a more highly electrified atmosphere is supposed to add luster to the hair.

In cold climates the goats are clipped only once each year. In southern and warmer climates two clippings per year must be made. Otherwise the goats will shed their coats and thus the mohair will be lost. The two clippings per year have been found to yield a larger average weight of hair, but the quality is inferior.

CHAPTER VII

THE PIG

The Wild Pig

The wild forefathers of our present pig of the sty — the wild pig — wandered in herds, amidst the woods, thickets, brambles, and jungles that at one time — very long ago — grew over a large portion of the world's surface.

These wild pigs had a hard struggle to live, for they had many enemies. The wild bear, the wolf, and the panther knew, long before man, how sweet was a dinner of pork, and so these beasts of prey were always on the lookout to capture and kill a stray pig.

These wild pigs were tall, long, lean, scraggy-looking animals, with large, narrow, sinewy frames, and arched backs, the bones of which stuck up in a very ugly manner. Their snouts were long and powerful.

In appearance these wild pigs were very different from the round-bodied, short-in-the-leg, long-in-the-back, short-in-the-snout pigs that we so often admire in well-kept sties and piggeries, and at agricultural shows, when these domestic

pigs are reasonably fattened, and not fattened out of all shape and use.

For purposes of mutual defense, these wild pigs lived in herds, so that if one pig of the herd was attacked, his ear-splitting squeals would soon call his fellow-pigs to his assistance.

That a pig's squeals are not only cries of fright, but cries for assistance, you can prove

WILD BOAR.

for yourself by trying to hold a pig by force. His overpowering squeals will cause all other pigs within hearing to leave off feeding and sleeping, and will arouse them to excitement. If possible, they will collect in a body and they will look like making an attack upon you in order to rescue their distressed comrade.

Remember that the wild pigs lived mostly in wooded places, where there grew plenty of thick grass, brambles, and undergrowth; so that when a herd of pigs were searching for roots and food, they could not keep each other in sight.

The herd, therefore, had to adopt some sound or signal to keep their members together, and to tell each other and their leader when they were attacked.

The constant grunt, grunt, grunt of a pig would be a splendid and effective signal to keep a herd of pigs together when they were searching for food amidst the undergrowth, out of sight of one another.

And no more effective sound could a wild pig have used, when attacked, than his piercing squeal.

So you see a pig's grunt and squeal are really forms of rude speech, or signals of speech, to keep the herd together for mutual help, and are also calls from a pig in suffering or danger to the other pigs of the herd for help.

The leader of the herd never failed to answer these squeals of alarm and for assistance; for the wild boar was a brave and perfectly fearless beast. He would attack anything, however small or large, and by means of his powerful head and shoulders could drive his fearful tusks into and rip open the body of his foe.

Very few wild animals, even in numbers, dared ever attack an old boar when he was in such a position that his enemies had to attack him in front, without a chance of reaching him either on his flank or in his rear.

Travelers tell us that the wild boar has been known to kill a tiger in fair fight, and hunters say that no animal is more to be feared than a wild boar at bay.

You may be quite sure that all the different sounds, pitches and grades of sound, throughout all the living world around you, mean something, and are understood by other animals of the same kind; and that the different animals and birds utter their different sounds or songs, because at one time they were of use to them for self-preservation.

When in the wild state a pig grunted and squealed for such long ages in order to preserve its life and the lives of its companions, that now he grunts from habit when in his sty, although his grunt can be of little or no use to him.

A Pig's Shape

The shape of a pig, the formation of his feet, the firmness of his well-knit flesh, the hardness and elasticity of his bristles, all point to the fact that his wild forefathers sought their food

amidst the sharp prickles of bramble and dense undergrowth of thick grass and vegetation.

A pig's skin is tough, his coat is bristly, his nose and head shaped like a wedge, so that he can force his way through dense vegetation. His hide is especially tough about the neck and shoulders, and is covered with bristly hairs, so that the thorns slide along and do not pierce the skin. In fact, a wild pig rushing headlong through a thick, thorny, undergrowth of bramble and briers is not merely uninjured, but probably, by setting up a healthy friction of the skin, he keeps himself in hard condition and in vigorous health.

A Pig's Fat saves its Life

You have read that a farmer's great aim is to produce a cow that will give the most abundant flow of milk on the smallest quantity of food, and to produce a steer that will come to maturity early and put on the greatest weight of flesh on the smallest amount of food.

The great object in feeding pigs for profit is to rear and breed only from those strains that will fatten the most readily and quickly on the food which you have or which you can spare to give them.

Some varieties of pigs will do best on one sort of food, other varieties will do best on other sorts

of food. Which variety of pigs will do best for you can only be learned, like many things in connection with farming, from your own experience, or from the experience of others who have been successful in your district.

The natural inclination of all pigs is to put on a large amount of flesh in a very short time.

By domesticating the pig, and keeping it in confinement, and breeding only from animals which produce small bones and much flesh, man has considerably improved on the wild pig for fattening and eating.

But man did not create the inclination on the part of a pig to put on flesh in a short space of time. This was necessary for a pig, when in its wild state, to put on flesh quickly, in order to preserve its life.

This may seem strange reading to you. What, you may say, a pig's fat preserves its life — how can that be? I should have thought the very reverse is the case, — that a pig's fat would endanger its life.

But just try to picture a wild pig's life.

By grubbing for roots with his powerful snout, he, probably, during the spring and early summer, got a spare living. By very hard work he could get just sufficient food to keep himself warm, keep up his strength, and keep himself alive; just sufficient food, in fact, to take off the

edge of his hunger. He, probably, during the spring and early summer, never could obtain sufficient food to give him a good square meal that would satisfy his appetite. Therefore he had no chance of putting on fat.

But the late summer and autumn come round, and then the pig's harvest is at hand. The beech masts or beechnuts, the acorns, — so fattening to pigs, — and all manner of nuts and tree fruits fall in abundance, and then all around is an ample supply of food.

No longer is there any need for the wild pig to work hard all day to search for, and root up, a scanty quantity of root food, because his food lies on the surface of the ground, requiring little or no effort to find.

The pig, therefore, can now fill his stomach, satisfy his appetite, lie down and sleep, wake up, and eat of the beechnuts, acorns, nuts, and fruits that have fallen during the night or during his sleep.

Therefore, during this time of plenty, the pig not only keeps up his strength and health, but stores up a reserve of fat over and above his immediate requirements.

We cannot think that the pig knew that he was laying in this store of fat to draw upon, against the time of the coming winter, when food would be so scarce and difficult to obtain. He

only ate his hardest and fastest in obedience to what his nature told him to do. The feeling that he must eat all he could of the good rich things around him was laid on him, and he did his very best to be obedient to this feeling.

During this time of plenty, his natural enemies, and especially the bears, let him alone, because the bears found that the ripe berries, honey, and nuts were a good change of diet for the summer, which they could obtain with much less difficulty than they could catch and kill a wild pig. There was the danger, too, from the brave old boar that guarded with desperate pluck the herd over which he ruled with absolute command.

Moreover, honey, nuts, and ripe berries were a more suitable food in the summer for the bears than a meal of pig flesh.

You must have felt in hot weather a much greater inclination to eat fruit, eggs, and vegetables than meat, and you are wise to carry out your inclination, for in hot weather you do not require food that creates much warmth. When the weather gets cold, then it is that you feel inclined to eat meat, because meat gives you heat which in cold weather you require.

You must have noticed how all animals in hot weather turn eagerly to cool food. The horse, when in the stable, will eat greedily of the green stuff that ought to be given him ; the cow will do

best on the young cooling grasses of the fresh pastures; and your pigs will do best on food that does not heat their blood too much.

So you see the wild pig had, during the summer and autumn, every chance of getting fat; but he had to get fat in a few weeks, and so the wild pig's descendants, our domesticated pigs, have inherited from their wild ancestors a natural inclination to put on flesh with greater rapidity than any other farm animal.

An animal takes in and digests its food through its stomach and intestines.

The pig has a small stomach but a long intestine, a longer intestine in proportion to its body than either sheep or cattle. In consequence of the long intestine, pigs are able to digest the food they eat more quickly and more thoroughly than any other animal; and as you have read, it is not the quantity an animal consumes that of necessity does good, but what the animal digests: in other words, it is the proportion of the food taken which is turned into flesh, fat, muscle, and bone, that does the good.

Some careful experiments have been made, and they prove that out of every 100 pounds of food which a steer digests 23 pounds go to increase the size of its body; that out of every 100 pounds that a sheep digests 26 pounds go to increase the size of its body; but that out of every

100 pounds that a pig digests 46 pounds go to increase the size of its body.

These facts show us that a pig can get fat in a shorter space of time than any other farm animal.

Let us return to the wild pig. He has had during the late summer and early autumn a good time of it and become very fat; but now the days begin to shorten, the air gets colder, the leaves have dropped from the trees, all the acorns and beechnuts and fallen fruit that the pig can find have been eaten up. Again he has to work hard with his snout to find his root food.

Then a little later, not only does food become scarce, but the frost hardens the ground, so that even his powerful snout cannot get beneath the soil for the roots that he requires.

Then it is that his terrible trial begins. Not only is all the surface food gone, and the ground hard, so that he can dig with difficulty, or not at all, but his enemies, the bears, have consumed all their summer food, and the cold weather makes them long for a dinner of pig flesh. And so the poor pig is constantly on the move, and is always fearful and on his guard against his destroyers.

You can well understand that under such conditions as these, many pigs would die of starvation or be eaten by their enemies, and only those

pigs could survive who, in the happy days of abundance during the late summer and autumn, have become very strong and have stored up a plentiful supply of fat. For when the winter days of scant food were upon them, the pigs had to live partially on their reserve of fat. Therefore, what we term nature has preserved only those pigs that in the few days of plenty could store up the greatest quantity of fat.

The farmer by his experience has noticed the natural tendency on the part of the pig to fatten quickly on a small amount of food, and has turned that natural tendency to his advantage by domesticating the pig, confining it in a pen, and feeding it for the requirements of man.

A pig will consume and do well on much that would otherwise be wasted. The whey from cheese; the buttermilk from the churn; the parings from the potato; the odds and ends left from the table; small roots, and potatoes that the farmer either does not care to eat himself or to give to his stock; the "bran and sharps" from the outside coats of the grains of wheat, the inside of which the miller makes into flour — all these things the pig will thrive upon. And so, by means of the pig, the farmer can turn the leavings of his farm into money.

The farmer indeed has to be grateful for that grim effort to lay on flesh in a short space of

time, that went on in those far-back ages when the pig wandered about in his wild state. And he should also be equally grateful for the fact that all those pigs that could not lay on a sufficiency of flesh in a short space of time were killed by their hungry enemies, or died from starvation during the severe cold of the winter.

It is well known that a pig by itself will not fatten so readily as two pigs kept together, partly, perhaps, because pigs are naturally sociable animals, and have been accustomed to live together in herds. Animals that have been accustomed to live in herds will fret when they are alone, and will not do so well as when they have a companion.

Another reason is that pigs are greedy, selfish animals. If you watch two pigs feeding out of a trough, you will notice that their one object seems to be to get as much of the food as possible, and they will gobble and swallow with the utmost rapidity, eating far more than they would do if they were alone.

Luckily, they can digest their food quickly — that is, they can turn it quickly into bone, flesh, fat, and muscle.

Why Pigs are Greedy

Is there any reason for the excessive greediness of a pig? Why should all animals whose

forefathers lived in herds gobble their food down so quickly? Place a plate of food before two dogs, or throw some meat into a kennel of dogs, and you can see their greediness and selfishness.

But place a plate of food before two cats; they will pick bits out with the utmost delicacy, and, taking them away, will eat in quietness and at their leisure.

What is the reason for these different methods of eating by the dog and cat? If you wish to live your best, to be keen in intellect and become a good worker, try to find out the reason for everything that goes on around you. There is a reason for everything; but owing to our imperfect knowledge, we only know the reasons for a very few facts. Trying to find out the reason for this and the reason for that makes all the difference between an intelligent man and a stupid one.

Well, why should a pig and a dog bolt their food with the utmost rapidity and greediness, while the cat and the tiger will leisurely and delicately eat their food?

Now, consider them in their wild state. Dogs and pigs lived in herds, and they had, you may be quite sure, great difficulty in obtaining their food, and when they did find a store it was more than likely that it was not sufficient to satisfy the hunger of every member of the community;

so, to get anything like a meal, each member had to eat its hardest and fastest.

You cannot imagine any condition of things more likely to make an animal greedy or selfish.

Now, cats did not live in herds, but in pairs, and so when they killed some animal for food, they dragged it away to their caves, or lairs, and being only two, and perhaps a few little ones, they had more than sufficient food for all; there was no need for them to bolt their food, and in consequence they ate quietly and at their leisure.

This is probably the explanation of the different methods of feeding of the dog and pig, and the tiger and cat.

Reason for a Long and Powerful Snout

It was a necessity for a wild pig that he should possess not only a very powerful, sensitive snout, but also that he should possess a very keen smell, in order that before he began to dig it should tell him of the whereabouts of the roots upon which to feed.

The modern pig, therefore, inherits from his wild ancestors a very powerful snout. So powerful is it that unless a ring is put through his nose, he will root up the bricks and stones of which the floors of some pigpens are made.

Not only is the pig's snout very powerful, but

it is also very delicate; so that the least crevice or crack between the stones or bricks of the pen can be detected.

A pig's smell for underground roots is so strong that pigs have been trained to hunt for truffles. The truffle is related to the mushroom, and is considered a great delicacy. It is about the size of a plum, or small potato, and grows about one foot beneath the ground, and upon the roots of certain oak trees.

A pig was once broken in by a gamekeeper to tell the shooters the whereabouts of a covey of partridges, and it was observed that the pig noticed the scent of the partridges when it had been passed over by the best pointer dogs.

You see how, to preserve its life in the wild state, an animal adopts certain habits. Man, then, observes these habits, and seeks how they can be of use to him; so he domesticates the animal and presses it into his service. But man goes farther than this: he is not satisfied with the habit of the wild animal; by selection, or by breeding and rearing only from those animals that look nearest like the ideal he has in view, he still further develops the habits of the wild ancestry.

In their endeavors to escape their enemies, to live and not to die, a wild horse developed powers of speed, a wild cow developed powers of

producing milk, a wild pig developed powers of putting on fat in a short space of time. And these habits, acquired by animals when in their wild state, have been used and increased by man in the service of man, and have added to human happiness and power.

Is a Pig a Dirty Animal?

A pig is said to be a greedy feeder, that will eat almost anything either in the vegetable world or in the animal world. If, however, a pig had been a dainty feeder, he could not have survived the hard time he had to live through when in his wild condition. But it is because he will eat and thrive on almost anything, live where other farm animals will starve, that he is so valuable to the farmer. Any waste from kitchen, dairy, or garden can be turned to profit as food for the pigs. And if a saucepan or kettle is kept going, as it always ought to be where pigs are kept, the small and diseased potatoes, every kind of small roots, and all the green refuse of the garden, can be put into it and boiled into a good dinner for the pigs. If it be near selling time, and you wish to push your pigs on a bit, add to the stew a few handfuls of meal and bran.

Don't despise the pig and its unclean, greedy habits of eating, because it is owing to these

very habits that he has helped, and is helping, to support many a home.

It is said that the pig is a dirty animal in its habits. This, however, is not so if the animal is given a chance of being clean. Let the pen face a warm aspect, say south, and let his sleeping place contain some clean litter or straw ; let the floor be made of hard brick, or, better still, of concrete, and let it be so sloped that all the wet runs into a drain cut along the end of the pen which in its turn empties into a cesspool outside. Feed with such food that, while you fatten him, you keep his blood cool, and you will find that he is a cleanly animal.

But give him food that heats his blood, with no cooling salt and green stuff, and let his pen be filled with dirt and slush, with no proper drainage, and the poor beast will naturally lose all self-respect, and roll in the filth to keep the heat of his blood down.

The more you treat animals with consideration and thought, or as you would wish to be treated if you were in their place, the greater will be your success with them, and the more money you will make out of them.

The sweeter will be the bacon, and therefore the better price will it bring, if the pig be kept under wholesome conditions and wisely and carefully fed.

But not only does our pig consume all the waste, but after he is killed he leaves no waste behind him.

All parts of the pig are useful. Even the head and feet are pickled and sent to market. The blood, too, may be used to make a very rich and wholesome pudding. The skin is made into saddles. The bristles, especially those of the wild boar, are made into brushes. The internal fat is made into lard. The intestines are used for sausage coverings, and other internal parts may be fried and eaten. The body, when fresh, is cut up into joints, and when pickled, salted, and smoked is marketed as bacon, sides, and hams.

You have read that the pig is a good utilizer of waste material about the farm. No farms should be without them. Just how many may be kept will, naturally, depend upon the quantity of waste there is about a place. Where there is only a small farm, and comparatively few persons on the place, one or two pigs will consume all the waste. But on the large farms or ranches, where a great many men are employed, there will be a sufficient quantity of waste to feed a number of pigs.

The pigs kept about a farm may be considered as merely accessories, and the meat so produced is often eaten by the farmer and his family and hired men.

There are, however, farms where pigs are raised for market in large numbers. On such farms pig raising is the main object in view. Roots and forage are raised with the special object of supporting and fattening the largest number of pigs. The aim, therefore, of these farmers is to produce an animal which will yield the largest quantity of marketable meat upon the least amount of food in the shortest possible time.

In the early days of our country every farmer produced his own meat upon his farm. He killed and "put up" his pigs, prepared his bacon and hams, and pickled or "corned" his beef. Nowadays, very little of this is done. The growth of the "packing-house" industry, coupled with the development of rapid railway transportation, have rendered it cheaper for the farmer to buy his meat both fresh and prepared.

Whether it be crops or animals, the highest quality yields the largest profit, and pigs are no exception to this rule. It pays best to keep only the best breeds which are suitable to the conditions of the districts and markets. Give the animals the best of care, feed them well, and see that they have good and clean quarters. A well-bred animal comes to maturity earlier, fattens more readily, yields a finer quality of meat, and costs no more to keep than a roughly bred

animal. In addition, he brings a better price in the markets.

There are still a great many rough or "scrub" pigs kept in our country, but the tendency is in the direction of improved breeds, and methods of feeding and keeping them. Our farmers are becoming better educated. The progress of science and the results of scientific experiments by our American colleges and experiment stations are teaching the farmers how to breed better animals, and how to feed them to better advantage. This is true not only with the breeding of horses, cows, pigs, and other animals, but in all lines of agricultural pursuits.

Hogs can be raised at a profit in any locality where crops to feed them can be raised cheaply. At one time it was thought impossible to raise pigs without corn, and consequently those localities where corn could not be produced were thought unfit for profitable pig raising. This has been found to be a mistake, and we now have pigs profitably raised without corn.

Pigs thrive on a variety of feeds, and wherever these feeds can be produced abundantly and cheaply, pig raising can be carried on at a profit. Alfalfa has been found to be an excellent crop for pigs. During the past few years the cultivation of this wonderful forage plant has been extended to all parts of our country. The

introduction and successful growth of alfalfa in parts of the United States where a few years ago it was thought impossible to raise it, has greatly extended the possibilities of the production of all classes of farm animals.

A plentiful supply of good, clean water is essential for successful pig raising. A large stream of water is not necessary or even desirable, partly because of the dangers from overflows and partly because a large stream may often carry deadly disease germs long distances, from one herd to another.

A good spring which is not contaminated with drainage is by far the best source of water-supply. Shallow, stagnant pools, where the pigs can wallow, are undesirable, and should never be permitted. Such pools are in far too common use, and while undoubtedly many hogs have been successfully reared amidst such conditions, it is also true that much loss from disease has been occasioned thereby.

It is a common idea that a pig needs to wallow in the mud in order to thrive. This is a mistake. Pigs wallow to cool themselves when they are overheated by being fed with a large excess of heating foods during warm weather. Give them food suited to the weather conditions, — food which will not overheat their blood, — and plenty of pure, clean water to drink, and

they will not care to wallow. Shade should be provided to protect them during the heat of the day. And the best shade is obtained from trees in the pig yards. Trees do not obstruct the circulation of air; therefore, they are better for summer protection than buildings of any kind.

Pigs thrive better when kept in small droves than when they are kept in larger numbers. In a large drove, the older or stronger pigs always crowd out the younger or weaker ones, and, therefore, it is advisable to divide the droves, according to their different ages and sizes.

Pigs should have sufficient exercise to keep them in a healthy growing condition, but not enough to make them thin. The yards should therefore be large enough to allow the pigs to exercise. It is a mistake to keep them continually in small pens.

Breeds of Pigs

The selection of a breed depends entirely upon the conditions existing amidst which the farmer is placed. The farmer to be successful in hog production must study his market, his means of transportation, and above all the kinds of feed he is able to grow, and the cost of producing them.

The breeds in most common use in the United

States are Berkshires, Poland Chinas, Chester Whites, and Duroc Jerseys.

Berkshires. — As indicated by the name, this is an English breed, originating in the county of Berkshire. It is safe to say that the Berkshire is the most common breed of pigs in the United States. They were first imported about 1825, and since that time much attention has been given to their careful breeding by American breeders.

Berkshires when properly fed ought to weigh at six to nine months between 200 and 250 pounds live weight. They gain in weight up to two years old, when a weight of from 500 to 600 pounds is not exceptional.

The color of the American-bred Berkshire is black, with white feet and small line of white on the face and a white spot at the tip of the tail. The face is short and "dished." The ears are erect and inclining forward, but thin and delicate.

They are good rustlers and will make a good living for themselves when turned out to pasture. They quickly respond to fattening food.

An important consideration is that there is less loss between live and dead weight than with most other breeds.

Objections cited against the Berkshires are

nervousness and excitability, thus rendering it necessary to handle them very carefully. It is also claimed that their bones are extremely light, and therefore they are easily liable to mishaps and accidents. When carefully handled and properly fed, there is perhaps no better variety of pigs.

Poland Chinas. — This breed is distinctly American in origin and type. It originated in Ohio, where the type was fixed. The breed is a mixture and blending of the following breeds: Big China, Berkshire, Irish Graziers, and Byfields. And the basis upon which the breed was established was a so-called "native" hog, which was brought in by early German settlers, supposedly from Poland.

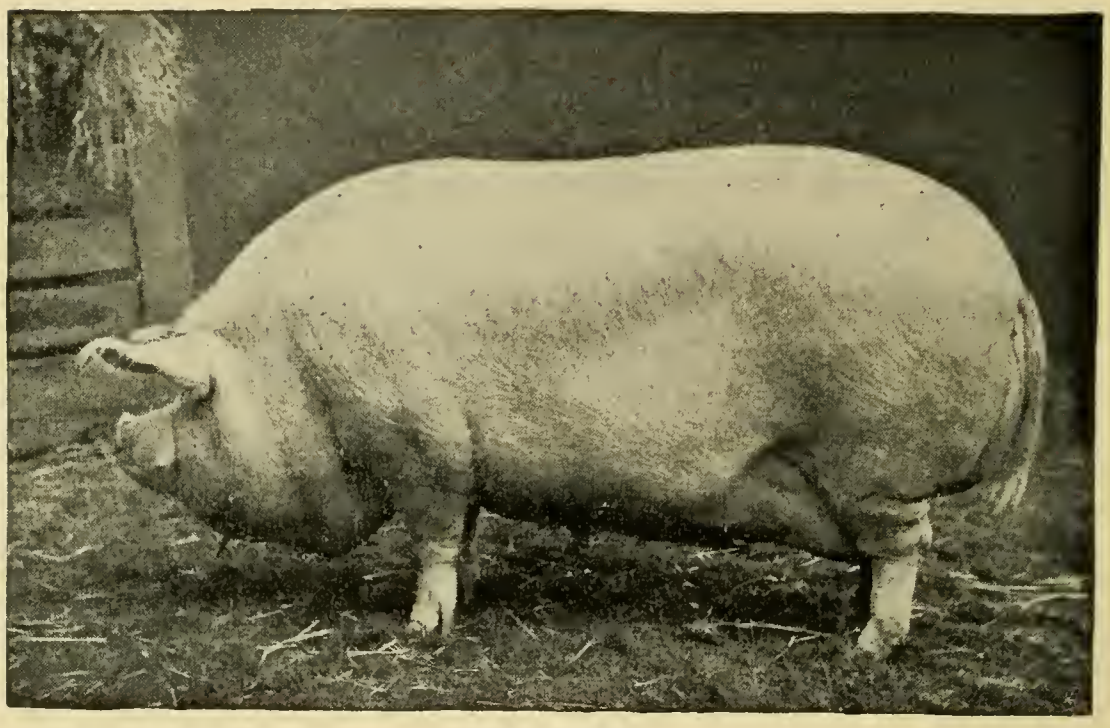
The color of the Poland Chinas is black and white spotted, either white or black predominating. They are very large. At maturity they weigh from 600 to 750 pounds, and shoats 9 months old easily attain 250 pounds. The face is dished. The ears are large, thin, and drooping — "lop ears," as they are called.

The Poland Chinas are said not to be such good grazing animals as the Berkshires. When turned out, they cannot take such good care of themselves. But they have a quiet disposition, are not excitable, and therefore are not liable to lose in weight from this cause. They have a

strong, fine bone, which permits them to carry a large load of fat safely.

Chester Whites. — This is another breed of American origin. It derives its name from the place of its origin, Chester County, Pennsylvania.

As indicated by the name, the color is pure white. The head is short, with long, thin ears



LARGE WHITE.

pointed forward and with a decided "lop." In size the Chester White ranks with the largest breed, weighing at maturity from 600 to 700 pounds. A nine-months-old shoat will weigh about 175 to 250 pounds. They are especially adapted for corn-feeding, and are said to surpass all other breeds in the rapidity with which they

will fatten on this feed. They are quiet, even lazy, consequently fatten easily. The breed is not suited for hot climates.

Duroc Jerseys. — The positive origin of this breed is not known. A strain was bred for many years in New Jersey, which in time became known as the "Jersey Red." At the same time, another strain of red pigs was being bred in New York, which in time became known as the "Duroc." Later it was discovered that these two strains were undoubtedly of the same origin. Although they were bred and improved in different localities, the two strains were found to possess qualities common to both. The two strains were finally recognized as the same breed and were given the name under which they are now known, viz. — Duroc Jersey.

The color is a cherry or sandy red, without admixture of other tints. The face is only slightly dished. The ears are not large, but are drooping. The Duroc Jerseys are among the largest of the modern breeds, weighing at maturity from 400 to 700 pounds, and marketing at 8 or 9 months from 175 to 250 pounds, dressed. They are especially long-bodied animals, thus making larger "sides" than most other breeds, which many buyers consider an advantage. Duroc Jerseys are quiet animals, are ravenous feeders, and do well on grass

pasturage. They fatten easily and grow very rapidly. They are adapted to conditions in the Southern States, as they can stand the high summer temperatures.

Certain strains of pigs have been bred for the purpose of making pork. The best animal for this purpose is naturally the one which can convert a pound of feed into the heaviest and best quality of meat in the shortest possible time. For generations these animals have been selected by breeders, while the inferior ones have been rejected. In consequence, strains of animals have been fixed which tend to make rapid growth upon a small amount of feed.

The scrub pig, on the other hand, has not been bred with any particular end in view, except perhaps to develop an animal which will, with a hardy constitution, take care of itself on the scantiest and roughest feed. Amidst the primitive surroundings in which the scrub pig lives, it naturally has not developed a quick growth or easy fattening qualities. It is very little different to-day from its wild ancestors. In the absence of both nuts and berries it must either root for its living or die, and in its endeavors to live amidst hard conditions the quality of its meat has greatly suffered.

Over a large portion of our country — especially in the Southern States — these scrub pigs

have been nicknamed "Razor Backs." These animals are very different from the well-rounded, highly bred animals. They are poor and gaunt, and the quality of their flesh is inferior. Of course, as it costs practically nothing to keep them, they will continue to exist until an enlightened policy proves the wisdom of keeping only the better-bred animal.

CHAPTER VIII

POULTRY

Wild Fowl

In the jungles or woods of India there is found to-day a wild fowl somewhat like, in coloring and appearance, the domesticated game fowl.

When Europe was in an uncultivated condition, when there stretched far and wide tracts of forest and wood, with dense undergrowth of bracken and bramble, uncleared and unclaimed by man, a wild fowl similar in appearance to that found to-day in the jungles of India lived and wandered without restraint.

From this wild fowl it is said that most of our domesticated fowls have descended.

Had it not been for man's needs, the original wild fowl would still have wandered here and there as it desired, unaltered in appearance and habits; and then no Plymouth Rock, Wyandotte, or Buff-Orpington would have tamely occupied our barnyards and poultry runs.

Man's necessities compelled him to catch and confine the wild fowl, to improve their power

of laying eggs, and also their power of putting on, in a short time, a quantity of white flesh.

If man wanted a good table fowl, he "set" the eggs laid by those of his hens that looked as

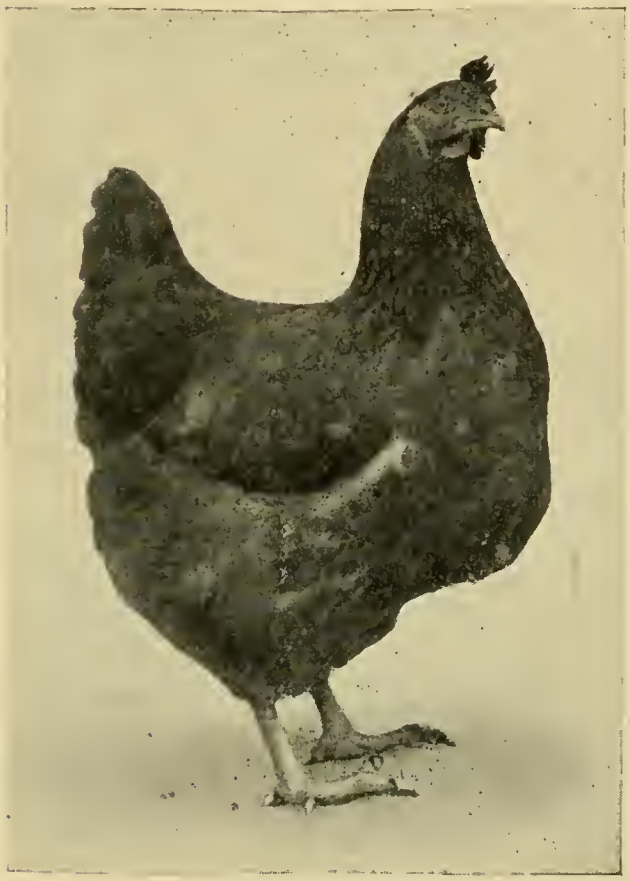
INDIAN JUNGLE FOWLS.

The probable ancestors of our modern fowls. About the size of a bantam.

if they would make a rapid growth, a fine white quality of flesh, and a large amount of meat on the breast.

If man wanted a large quantity of eggs, he

simply "set" the eggs laid by those of his hens which had produced the greatest number of eggs in a given amount of time with the least inclination to sit. And so he went on, selecting and selecting in this manner, until, in course of time, he bred a race of hens that have lost a mother's instinct, and do not offer to sit.



BUFF-ORPINGTON.

The hens of this race have been bred mostly around the Mediterranean Sea, — Ancona Andalusians, Leghorns (Italian), Spanish, Houdans (French), Minorcas.

But most keepers of poultry require a strain that will lay a fair amount of eggs, and chickens that will grow quickly, on the smallest amount of food, into fine tender birds for eating; a fowl that will sit close to her eggs and make a good and faithful mother; so primarily for size there have been bred the Asiatic breeds, such

as the Cochins and the Langshans, and for general purposes the Plymouth Rock and Wyandottes, both American breeds, which make admirable all-round, general purpose fowls. The English breed, Buff-Orpington, is also an excellent general purpose bird and now finds much favor among American poultry keepers.

Poultry on the Farm

Most farmers look upon the fowls about their barnyards as the most insignificant part of their live stock. Often the grown adult male members of the farmer's family consider it beneath their dignity "to waste their time" on the care of the hens. If the poultry does get any care, it is usually left to the overburdened housewife, with such assistance as she may be able to get from the younger boys and girls of the family. It often happens that the hens are allowed to shift for

BLACK MINORCA.

themselves. Despite this want of care the poultry and egg crop forms, as a whole, one of the most important and valuable products of our American farms.

There is always a strong demand for fresh eggs and high-class poultry. But in order to be

WHITE LEGHORN.

really profitable, eggs and poultry must be of the best quality. When our markets are filled to overflowing with the old, stale, ill-flavored storage eggs and the thin, tough, and frozen poultry, it is not surprising that purchasers pass them by and give their preference to beef, mutton, and pork.

We should eat more poultry. It is wholesome food, and ought to be used quite as ex-

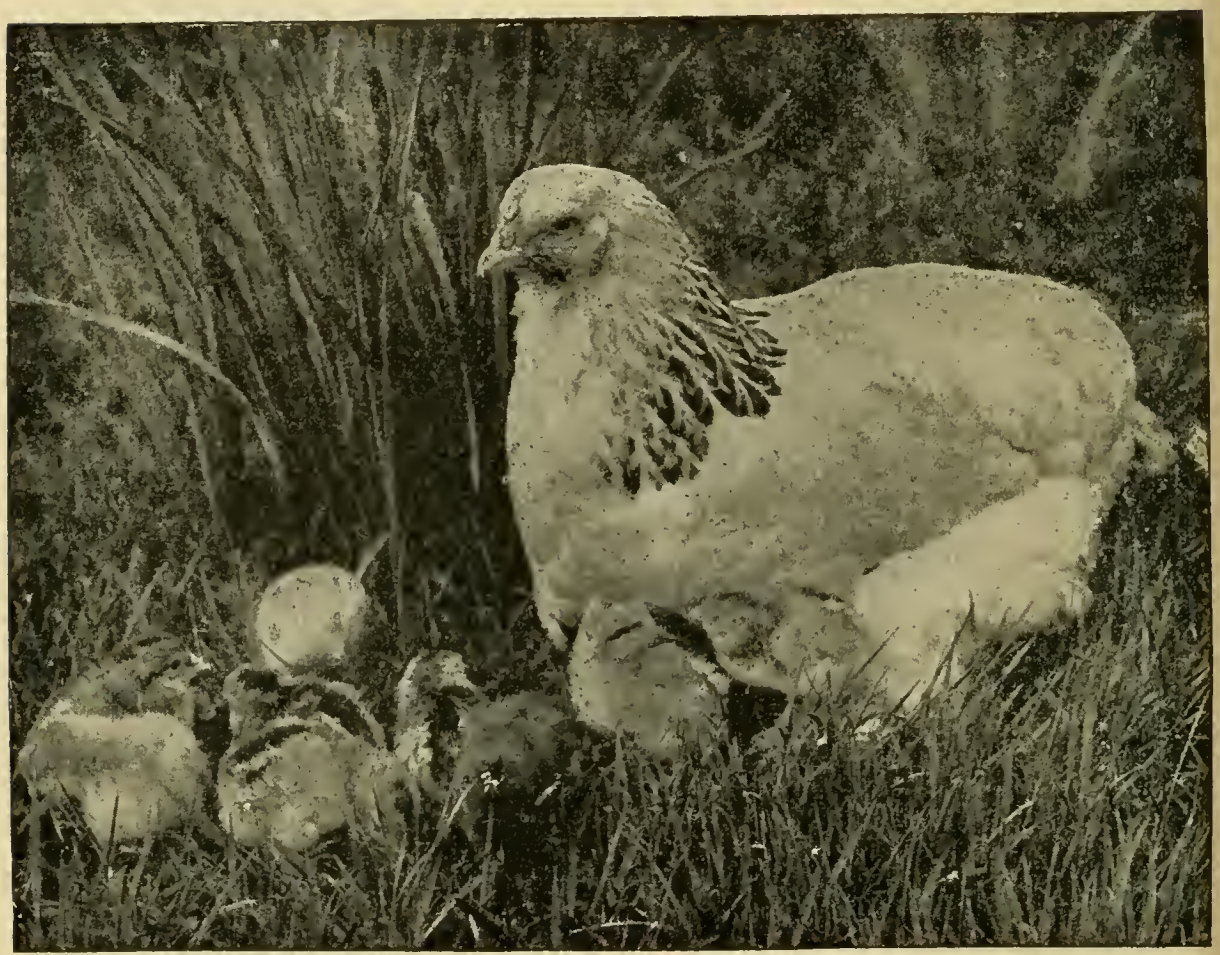
tensively as beef and pork. Doctors tell us that we should be far healthier if we replaced a large portion of our beef and pork diet by good poultry and mutton. An increased supply of

PLYMOUTH ROCK.

strictly high-class poultry in our markets would lead to an appreciation of what good poultry really is, and consequently a greatly increased market demand would be the result.

There is perhaps no stock on the farm which yields a higher relative profit for the food consumed than do the hens, and consequently, if they are economically fed and managed, the

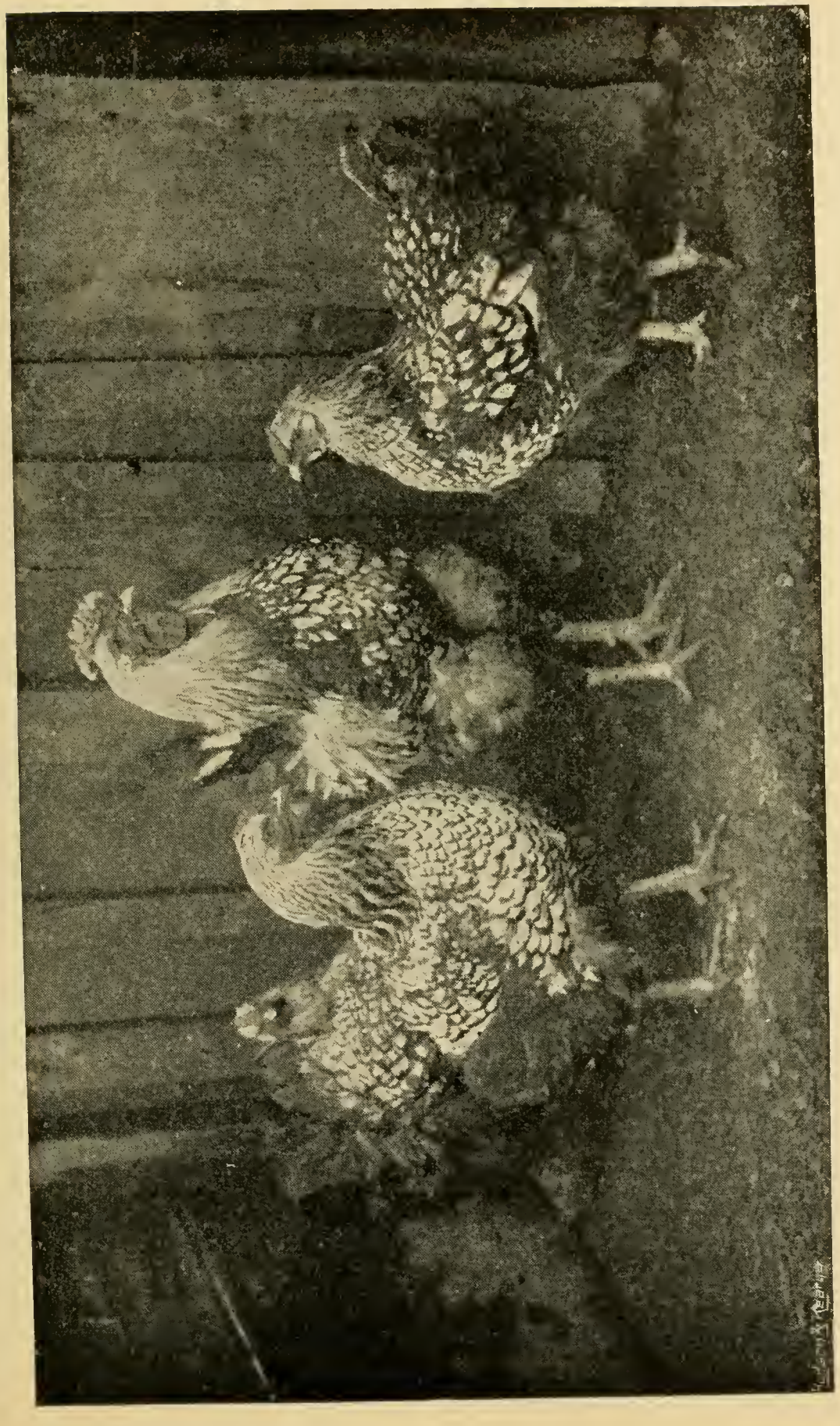
return from them will be proportionately increased. Most poultry products in the United States are raised as secondary crops on the farms. But there are many farms which are



LIGHT BRAHMA.

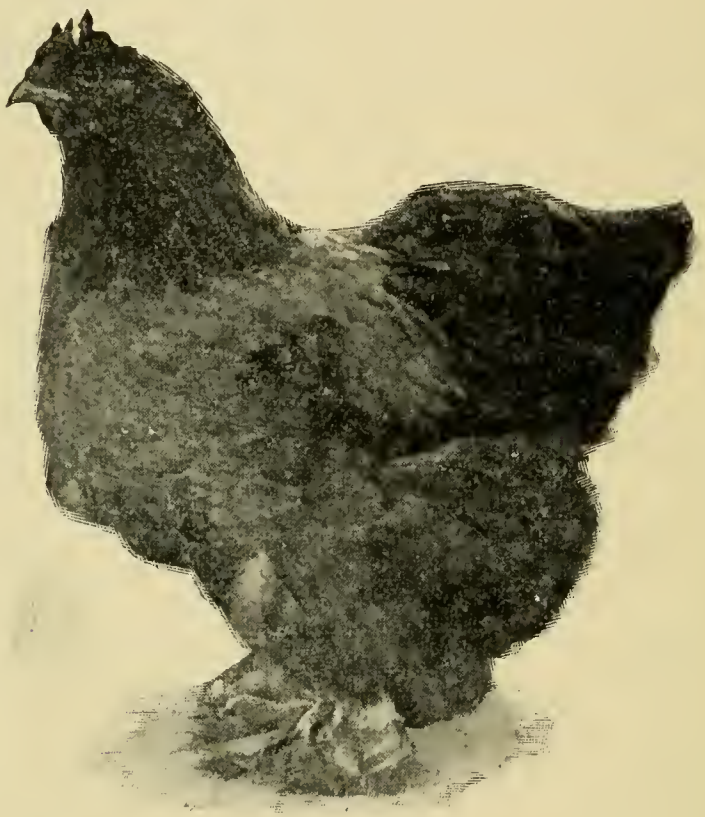
devoted exclusively to the raising of eggs and fowls for the markets, not to mention the establishments which make a special business of raising fowls for show purposes.

The ordinary barnyard fowls can obtain practically their entire living about the farm, provided they are not kept in greater numbers than



SILVER WYANDOTTES.

the farm will support. These barnyard chickens are hardy and vigorous, are accustomed to shifting for themselves, and yield a fair return in eggs and birds for the table. They respond well



BUFF COCHIN.

to good treatment, and it has been said that one cannot wish for a better foundation upon which to establish a strain of high-grade, profitable birds.

The standard breeds have been brought to a high development by skillful selection, management, and care. In consequence, they suffer from neglect more than the common-bred fowls. Unless, therefore, we are prepared to give these

highly bred strains special care, it is not wise to keep them.

There are certain seasons of the year when fresh eggs are scarce and consequently they then sell at high prices (often from 4 to 6 cents apiece is willingly paid for first-class fresh eggs). In order, therefore, to obtain the benefits of these prices, the poultry should be so managed that the hens will lay at the season of the year when eggs are bringing a high price. This is accomplished by having the chicks hatched early in the year, and then seeing that they are specially fed, warmly housed, and protected from damp and cold winds.

Then, too, the returns from the hens can be increased by keeping only hens which will lay a large number of eggs during the year. The average for a good laying hen is 100 eggs per year. But by selecting and rearing chicks only from those hens which lay the greatest number of eggs, the average yield can be gradually increased. In this way strains have been bred which average 200 and even more eggs per year. It costs no more to feed and care for a hen which lays 200 eggs during the year than it does to feed and care for one which lays only 100 during the same period. It is easy to see, therefore, that the profit from a flock of the former fowls will be more than doubled.

The secret of successful poultry keeping is cleanliness. This refers more to the condition of the buildings and yards where poultry are kept and the food and drink which are given them than to the hens themselves. The hens will keep themselves clean if they are given the chance. A good "dust bath" will enable them to keep off the vermin which otherwise will infest them. It is a common sight to see chickens dusting themselves, by shaking the dust through their feathers. This dusting kills any vermin which may be on them. If the vermin are numerous and troublesome, sulphur mixed with the dust will make the bath more efficient.

Housing

When it comes to the house and yards, however, the hens cannot help themselves. We must do that for them. The droppings must be removed daily, and the interior walls of the building must be kept free from vermin by frequent white-washing. The worst enemies of poultry are the small mites which infest the houses and which get on the hens during the night while they are roosting. The mites multiply with almost inconceivable rapidity and, if not destroyed, will soon fill every crevice in the house. These parasites keep the chickens weak and

thin, and render them unfit for the table or for laying.

The only way to keep the houses free from vermin is to prevent them from obtaining a foothold, and this can only be done by having everything kept thoroughly clean. The perches should be made so that they can be taken down and scrubbed. The henhouse should have as few cracks and crevices as possible.

The food given to the chickens should be clean and sweet. Sour food or "slops" are unwholesome, and are often the means of bringing fowls into such poor condition that they fall easy victims of disease. The water should always be fresh and clean. There is no more sure way of making fowls unhealthy than to give them unclean water to drink. The water vessels should be cleaned constantly, and they should be so arranged that the fowls are not able to get into the water. A satisfactory pattern consists of a closed vessel with a small opening at the lower end from which and around which a small lip projects. This arrangement allows only a small quantity of water to escape at a time — just sufficient to fill the lip, thus insuring a constant supply of clean water; no sooner is the lip emptied than a fresh supply runs in from the body of the vessel. These vessels are made of tin or earthenware.

These drinking vessels must be scalded at frequent intervals, because dirt or food which is always to be found clinging to the beaks of the fowls will drop into the water in the lip whenever the birds drink. This dirt gets into the body of the vessel and renders the contents unwholesome by turning the water sour. Many poultry keepers object to these closed vessels on account of the difficulty in keeping them clean.

We have said that the poultry houses should be kept clean, and free from vermin. Perhaps we should have said first that the fowls should be comfortably housed. That is, the houses should be so constructed that the birds may be kept warm in winter and dry during wet weather. Damp and draughty quarters are responsible for a great many of the troubles which afflict poultry. The buildings should, then, be placed on high and dry ground, and above all where the sun can shine on them. It is a great mistake to place the poultry houses in some dark corner in order to get them out of the way, as is so often done. Another important point to be observed in placing the poultry house is to detach it from the barn or stable. The poultry house should stand alone.

There are many reasons for this, chief of which is the necessity for plenty of sunlight. This is impossible if the poultry are housed in the barn.

Then, too, it is impossible to keep the hens clean in the barn, and should the quarters become infested with vermin the horses and other animals are likely to become infected.

It is important that the perches should not be placed too high above the floor. A height of two or two and one-half feet is ample, and all the perches should be of the same distance from the floor. At this height the fowls can fly up and down without danger of injuring themselves. By having all the perches the same height above the floor, there will be no crowding on the highest perch, which otherwise is sure to occur, as hens seem instinctively to try to get on the highest point above ground when at rest. This is undoubtedly a trait inherited from their remote ancestors, which had to seek the highest points at night in order to be secure from their enemies, the wolves, foxes, and other animals.

A very good method of housing poultry is by means of movable houses, which can either be built on the farm or purchased from the makers at small cost. These houses are so built that they can be moved from place to place. They contain a shelter underneath as a protection against rain and wind, which also acts as a dust bath. The nest boxes can be reached from the outside, so that the eggs can be taken without going inside the house. The perches are broad,

and placed within two feet of the floor. The floor is in two parts, so that from time to time it can be taken up and well scrubbed. The house is freely ventilated from the top, and well lighted by windows. Moving these houses about from place to place prevents any one stretch of land being fouled, — a matter so essential to the chickens' health and the well-being of the land.

Fowls that are not too thick on the ground will, by their droppings, manure the land. They will keep down insects and spread about the droppings of farm animals, scratch up moss, and aërate the roots of the good grasses.

Movable houses can be taken about the fields, placed on the plowed land and stubble, and in the summer the fowls housed in them will, if not placed too thick on the ground, nearly find their own living.

As regards the housing, each farmer must be guarded by the conditions in which he is placed. But, as we have seen, the principal points to be aimed at are light, good ventilation, cleanliness and absence of draughts, a good dry floor, perches broad and fixed firmly but not too high from the floor, and the house must be kept free from vermin. The fowls must also have plenty of shelter from the sun, rain, and wind, and dusting baths must be provided.

Feeding

Poultry can be kept with great advantage where there is a dairy, as the skim milk and buttermilk when mixed with meal form an excellent and strengthening food.

On a fruit farm fowls will greatly assist in keeping down insect pests, and during most of the season the hens may have free range without doing any injury to the orchard. Plum growers have found poultry very useful in keeping down their especial enemy, the curculio, and apple growers have found fowls beneficial about the trees.

When small fruits are forming and ripening the fowls must be kept away from them; but during the greater part of the year the fowls will do good work in clearing off insects.

Waste fruits will be very acceptable to the fowls in winter or summer. The waste from the vegetable gardens forms excellent food for the hens, as they need green food to keep them in good condition. Unsalable lettuces, cabbages, beets, carrots, potatoes, peas, corn, or other grains which for some reason cannot be marketed can be converted by the fowls into profit.

The best grain food for poultry — especially laying hens — is oats, crushed if possible. At one time corn was the universal grain food for

poultry, but experience has shown that corn is far too fattening to secure the best results. Large quantities of corn fed to fowls will often make them so fat that they become disinclined to lay. Wheat is a good grain to feed, but on the whole does not produce such satisfactory results as crushed oats or rolled oats.

In feeding any kind of grain, it is best to scatter it widely among straw or other litter, so that the fowls will have to work hard to find it. This gives them exercise, which is so necessary to keep them in good health.

Meat is also not only a good food, but practically a necessity, if the hens are to be kept in good condition. Meat scraps can be obtained from the butchers or slaughterhouses and should be given two or three times a week. Ground bones are excellent. These supply lime for making eggshells. Cracked oyster shells may also be fed for this purpose.

In addition, as we have already seen, green food is necessary. Where the fowls have a free run during the summer they will find a sufficient supply of green stuff, but where they are confined it must be supplied to them every day. Alfalfa, clover, and lawn clippings are excellent for poultry. It is best to have two or more runs, and then by changing the fowls from one to the other the green stuff will have a chance to grow

and thus give a continuous supply of green food. Turnips, beets, and other tubers make good food for the poultry, and may be fed either raw or cooked with the morning mash.

How Fowls digest Food

A fowl takes in food by its beak; thence down the gullet the food passes into the gizzard or stomach, where it is partly broken up or digested, and from the stomach it is passed into the intestines, which complete the digestion. The blood then takes up and circulates the digested food, and builds it into the fowl's bone, fat, and tissue.

In the gullet there is a large bag called a crop. Large quantities of food are taken in and stored in the crop; but no digestion takes place there, the food being simply stored and softened by the bird's saliva. The bird then digests the store in its crop at leisure.

You can understand when the wild fowl were surrounded on all sides by enemies it was far safer for them, when they did find food, that it should be swallowed at once and digested at leisure in some place of safety.

If they had to pick their food and chew it as they took it, they would be more exposed to danger, and would run a greater chance of being killed by their enemies.

For the same reason, namely, as a means of safety, cows, oxen, antelopes, goats, and sheep developed, when in their wild state, a formation of stomach which enabled them rapidly to take in a store of food, and then, retiring to a place of safety, quietly chew it up at leisure, — "chewing the cud," as it is termed.

The gizzard of a fowl, as you know, is a large, fleshy, thick substance supplied with two horny pads; these horny pads rub against each other and grind the food just as millstones grind wheat.

Fowls swallow small stones to help these horny pads to grind their food more thoroughly, and therefore, if the run does not naturally possess a supply of the necessary small stones, the poultry keeper must supply them. The gizzard and the stones do the work of teeth.

Do Fowls Pay?

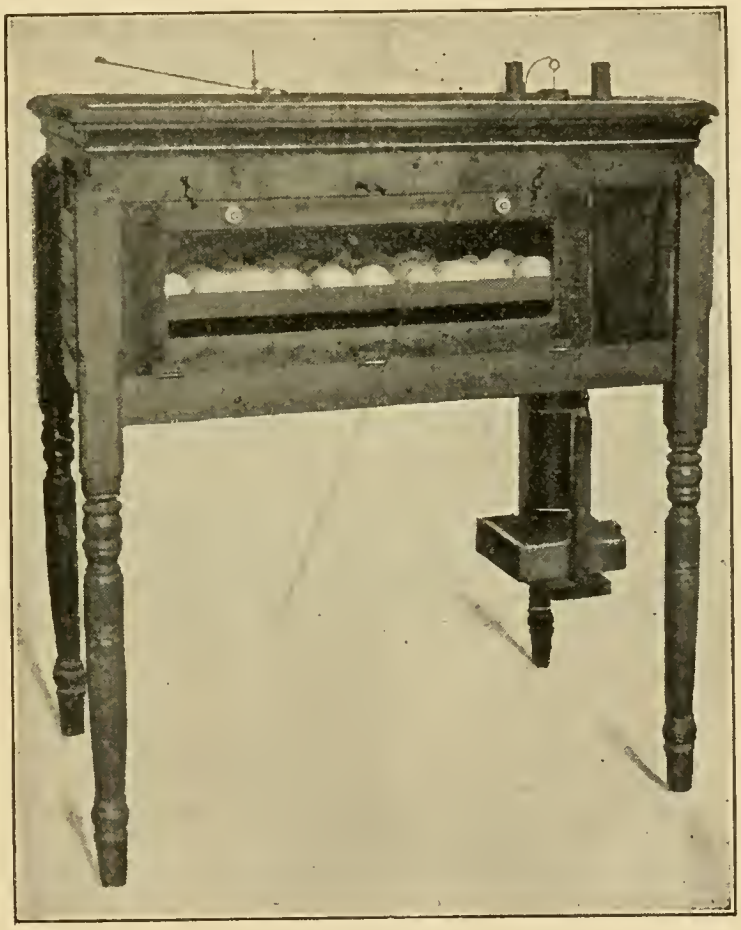
By close observation, careful selection, and experienced management fowls can be made to pay, but not otherwise.

The first rule is to obtain a strain of poultry suitable to your land and suitable to supply the wants of the market closest to you.

If you wish to produce eggs alone, you must, in the first instance, obtain a laying strain that do not want to sit. Then your hens must

lay eggs at a time when eggs are scarce and dear, namely, in the winter and early spring.

To obtain these early eggs your chickens must be hatched out early in the year, so that they will begin to lay during the winter and spring months. This of course means a great deal of

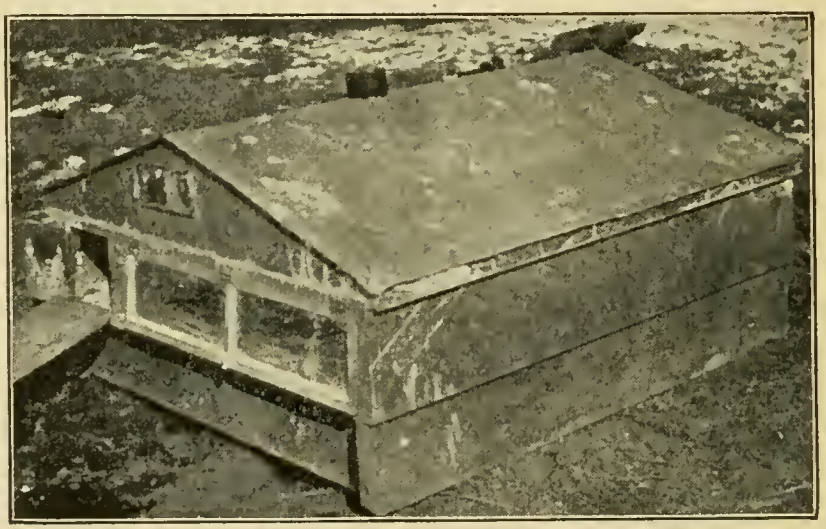


INCUBATOR.

care and trouble. But that care and trouble will be repaid by the extra price which the eggs laid in the cold months will bring.

Where only the non-sitting strains of laying hens are kept, other breeds must be kept to

hatch the chicks or the eggs must be artificially incubated. The latter method is usually employed, because it can be used at any time. If hens alone are relied upon for sitting, it may be often difficult to find a "broody" one, or one who wishes to sit. Incubators are machines which keep the eggs warm — at a constant temperature, just as the hen does when



AN OUT-DOOR BROODER.

she sits on them. It requires much skill and patience to succeed with incubators. Then, too, when the chicks are hatched, the greatest difficulties really begin, because the incubator-hatched chicks have no mother hen to keep them warm and to scratch for them. The young chickens require great care and trouble, for they must be kept warm and carefully fed until they have reached an age and size to care for themselves. But when all the diffi-

culties have been patiently overcome, the artificial hatching and rearing of chickens are by far the most profitable.

After one has obtained a good laying strain, he must, in addition — and this is important — still further improve the laying powers of his birds by "setting" only the eggs of those hens that lay the greatest number of eggs.

By thus setting the eggs and rearing the chickens of your best-laying hens, and, season by season, carefully following out this law of selection, it is almost impossible to say to what pitch of egg-laying perfection in a few years your hens may reach.

It is said that to obtain the best egg-laying results, no hen ought to be kept longer than two years. After she is two years old she falls off in the number she lays, although the eggs she does lay are probably larger and better flavored.

Here is another important point to be considered. Supposing you possess a well-bred strain of hens, and by your own selection each hen has reached a power of laying a much greater quantity of eggs than the usual hen lays, then your strain becomes noted and valuable and can be sold at fancy prices.

It is far more profitable to keep a few hens, on sound business and scientific principles, than

to keep a much greater number when these principles are neglected.

Be careful to collect the eggs every morning, so that they are clean and free from spot and stain.

All agricultural produce that is sent to market in a clean and fresh condition brings a better price than produce which has been marketed with less care.

Instead of sending your eggs to a central store or dealer to be graded and packed for the markets, it will be more profitable to supply private customers, for you will not only save the profits of the commission merchant or "middleman," but you will always be sure of a profitable and steady demand for your eggs. But if reliable and steady customers who will take all the eggs you can supply cannot be obtained, then select reliable business men to market your produce to the best advantage in the large cities. It would be well if we could have central coöperative establishments, patterned after the Danish coöperative stores, to which the farmers could ship their eggs and have them graded and packed to suit the requirements of the various markets.

CHAPTER IX

THE DOG

The Wild Dog

Dogs have been domesticated for such a long time that the distinct strain of the dog family from which they have originated is not known with certainty. Some writers think that our domesticated dogs are direct descendants of the wild wolves and jackals, to whom they are closely related.

There are wild dogs in existence. In Australia these wild dogs are called "dingoes," and in India they are called "dholes." It is said that these wild dogs are descendants from domesticated dogs which have reverted to the wild type. But whether this is true or not is still an open question. The wild dogs live in packs or communities.

We are therefore quite safe in saying that the ancestors of our domesticated dogs lived in communities or packs. And in order that they might live in these packs to the best advantage to themselves, they were compelled to obey certain well-understood dog laws.

If you think, you will at once understand that all animals that lived in herds, flocks, or packs were obliged to obey certain laws if the race was to live and not die out.

To be successful in hunting their prey, in defending themselves against their enemies, in protecting and rearing their offspring, a set of rules was a necessity.

A number of dogs working in harmony and rendering each other mutual aid would have a much better chance of obtaining a supply of food than a single dog hunting for itself.

Moreover, a single dog hunting alone would have a poor chance of running down and killing an animal much bigger than itself.

But the largest animal, possessing the most formidable horns, the hardest kick, or the sharpest and largest teeth, would have small hope of escape with a pack of hungry dogs, yapping and barking all around, just waiting for an opportunity to rush in.

Then think how much better chance a pack of dogs have of finding and keeping their scent than a single dog. One dog loses the scent, another dog picks it up, and with tongue and wagging tail tells the other dogs of his happy find.

Then the searching, spreading dogs gather

together at the joyful, well-understood signal, and with noses to the ground and tails in the air, away they go, fast on the trail of the unlucky animal they are hunting.

Any one who has ever watched a pack of fox-hounds at work, and is gifted with a slight imagination, can picture the working of a pack of wild dogs, the wild ancestors of these fox-hounds.

At a word from the huntsman, with tails in the air, they spread themselves over the covert in search of the strong scent of the fox. At first no whimper is heard, not a note, all is silent, save for the cracking of twigs and occasional call of the huntsman's voice. Then one keen dog pauses, sniffs quickly and earnestly, his tail quivering with emotion, a signal that the scent is near, but that he has not quite got on it yet. At last he picks it up, and with note and tail gives the well-understood signal to the pack. And the spread pack gathers gladly from all parts of the covert to get on the scent that the fortunate dog has found.

You can see what a much better chance a wild pack of dogs had of obtaining their prey if they gave each other mutual help in searching for the scent, and gave a joyful note when the scent was found.

FOXHOUNDS.

Expressions of a Dog's Tail

How varied are the emotions betrayed in a dog's tail! It tells of joy and pain, of fiercest anger or deepest affection; whether the dog feels shame or self-respect; whether he is bubbling over with strength and spirits or overcome with weariness or fatigue; whether the scent is near or is found; whether the prey is just within reach of mouth and claw.

Then watch two dogs — strangers to each other — walk round and take stock of each other. At other times watch how, at a distance, they will lie down and point at each other, and then rigidly arise and very slowly and carefully advance. After having come up to each other, very proud and erect, they will, depending on whether they are naturally friendly or antagonistic, have a rough and tumble, or pass on with the utmost unconcern. You can read it all in a dog's tail.

Every movement and habit that we observe in our domesticated animals had its beginning in the ways and habits of their wild ancestors.

And these ways and habits, remember, in their turn had their beginnings because they were of some use to the wild race that acquired them.

Man observed the habits of the animals when

in their wild state, or he captured and tamed the young of the wild animals, and then afterward found out the ways that were natural to them. In order to make the animals most serviceable to him, man either modified or very strongly developed the wild traits which he found.

Why Dogs are Sociable

Dogs, as you have just read, evidently lived in packs. Experience had taught the race of wild dogs that union meant strength, meant beating off their enemies, meant a better chance of obtaining a bit of sheep, deer, or even some other larger animal for supper. But when the prey was pulled down and killed, mutual help was at an end. Every dog for himself was then the rule; so each dog crammed and bolted the utmost amount of food he could swallow, without any regard for the other dogs of the pack.

Where two or more dogs, especially young dogs, are kept together, they will swallow their food more rapidly than is the case where one dog is kept alone. It would seem that, when the dogs are together, the old instinct to bolt their food as rapidly as possible shows itself very distinctly.

The wild dogs, living in packs, had in a

measure to give and take, had to learn a rude sort of obedience to the dog laws, and had to render at least a partial obedience to the leader of the pack.

Any dog of the pack that through an unruly disposition would not obey, or any dog that through a deficiency of strength and cunning could not obey, was soon cast out of dog society as being unfit to live.

So you can see at once that this made a dog inclined to be a sociable animal, and, therefore, he had not much trouble in adapting himself to the superior social ways of man.

Speaking generally, all animals that live in packs and flocks are more easily domesticated than those animals or birds that live a solitary existence, or live in pairs.

The cat and tiger tribe, which in their wild state live in pairs, are more difficult to domesticate than the dog tribe, which live in packs.

The barks and growls of a dog that protects our houses are due to the old wild instinct that guarded the lair of the pack.

The yells, barks, and shrieks of a dog in distress, that will bring around all other dogs within hearing distance, and the bark of a watch dog, that sets all the other dogs within hearing barking in their turn, are due to the old instinct of dogs in packs barking for help or in defiance.

The spaniel rushing through brambles and undergrowth is following the old instinct of hunting.

The rounding of the flock by the sheep dog, and running them in any direction that his master may direct, is a wild kind of hunting with the killing at the end almost stamped out.

May not the pause of the pointer when he stops and points, as soon as the smell of the partridge or quail on the air reaches him, be the old instinct, highly developed, of the pause that a wild dog makes in order to give him the final strength necessary to jump with rapidity and accuracy upon his prey? Was not the obedience of the dog to his master first learned when the wild dog was compelled to obey the leader of the pack?

The keen sense of smell that enables a terrier to gallop at breakneck speed on the track of a rabbit, that enables the pointer to "nose" on the air the scent of the hidden partridge, that enables a bloodhound to track man by the scent arising from his footsteps, — were not all these wonderful powers of smell first impressed on our dog's ancestors when their very existence depended on this keen and accurate sense.

Man has taken all these natural instincts and trained them to be of service to him, until the dog has become his close and useful companion.

There are many ways and habits in the animals that are about you that will interest you, if you will only observe them with kindness and sympathy in your heart. And the more you know of them the more they will interest you, and the greater will be your success in rearing and keeping them.

Different Breeds of Dogs

It would take far too much space in a short Reader to describe all the different breeds of dogs.

We can only briefly refer to those in most general use in this country.

In general, we may divide the breeds of dogs into six classes, depending upon the distinct uses for which they have been developed.

1. Hunting Dogs.
2. Watch Dogs.
3. Draught Dogs.
4. Sheep Dogs.
5. Life-saving Dogs.
6. Toy Dogs.

Hunting Dogs. — There are two classes of hunting dogs, — those used only in the chase, and those used for locating and retrieving the game. Among the first class are the Foxhound, Deerhound, Greyhound, Fox Terrier, and Dachshund.

Of the second class we have the Pointer, Setter, Retriever, and Spaniel.

Foxhound. — This dog has been most carefully bred; it is said to be the most perfect specimen of the dog race. It is built so as to combine speed with great powers of endurance or staying qualities, and is used in packs for the chase after wild foxes, which it runs down by scent and kills.

Deerhound. — This breed is somewhat larger and heavier than the foxhounds, and is used in hunting deer. In most parts of America the hunting of deer with hounds is prohibited on account of the rapidity with which the wild deer are being killed.

Greyhound. — This is one of the oldest breeds of dogs known. There are several varieties, but all have the same general type, being very tall, slender, and built to combine speed and strength. In America the greyhound is used solely for hunting rabbits, which it runs down and kills.

Fox Terrier. — The fox terrier is a very popular dog, both in England and America. He is quick, alert, and affectionate. He is ready to fight or jump on your lap; ready to follow on the trail of a rabbit, or to lie sound asleep on the mat, yapping in his dreams, as he goes over in his mind the latest chase or fight; ready to try conclusions with the biggest cat

of the neighborhood, or, with a knack learned from experience, to kill rats so rapidly one after the other that at last he drops down from sheer exhaustion.

The fox terrier was originally bred to run with a pack of foxhounds, so that when the

COURSING GREYHOUND.

fox goes to earth the fox terrier disappears in search of him, and when he finds him, he is taught not to close, but to stand barking till fox and dog are dug out.

Dachshund. — The word "Dachshund" is derived from the German, and translated into English means "badger hound." The "dachs-

hund" is a badger dog and is used in Germany for badger hunting. The breed is characterized by a very long body and short, stubby legs. These dogs can therefore follow the badger into his burrow, and are trained for this purpose. They make very good watch dogs, being alert and active. They are also very faithful to their masters, but have the reputation of being somewhat cross with children.

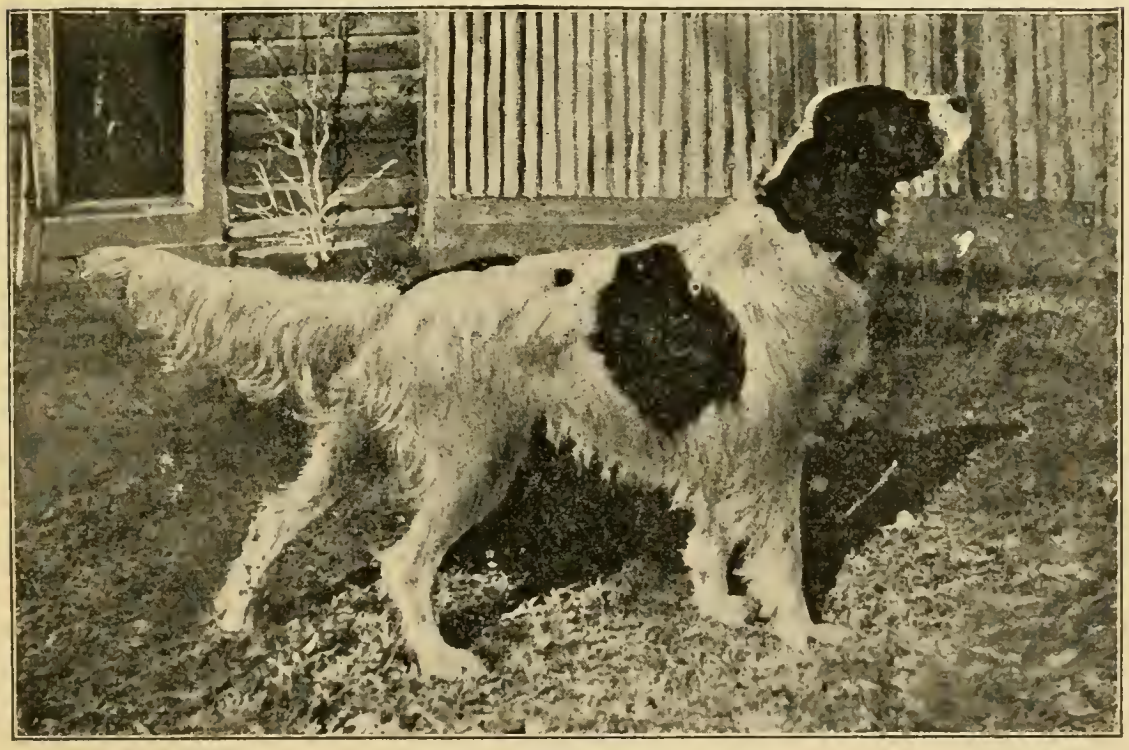
Pointer. — This dog, it is said, came originally from Spain and France. It was introduced into England about the year 1720. The old type of pointer was much heavier and clumsier than the present-day representatives of the breed.

In England the pointer is used solely for pointing or standing game. In America and Canada he is trained to retrieve and fetch as well as to point.

Pointers are very intelligent and may be taught many tricks and feats with comparative ease. They are exceedingly docile and affectionate.

Setters. — This breed takes its name from its original habit of setting or crouching when it scented game. Setters are now, however, trained to stand rigid when they have found game, or "to point" as does the pointer. In size, in intelligence, in general disposition, as well as in

POINTER.



SETTER.

action in the field, the setter is very much like the pointer. The only real difference is in the length of hair. Pointers are short-haired and smooth, while setters have long and curly hair.

There are three varieties of setters: the *Irish*, which is of a mahogany-red color; the *Gordon*,

CURLY COATED RETRIEVER.

which is black with tan markings; and the *English*, which is black, tan, and white, or white and black.

Retriever. — Any dog which is trained to retrieve or fetch game, after it is shot by the hunter, is a retriever. But there has been developed a strain of dogs which are exceptionally fitted for this work, and to this strain the name retrievers has been given.

The retriever is a good-looking, all-round, sagacious dog, and makes an excellent compan-

ion; one variety has a curly coat, another has its coat flat or wavy.

This dog should have a kindly and sensible look in his face, for the work that he is put to requires more cleverness than that of most other sporting dogs.

Spaniel. — This is a delightful dog. The variety known as the clumber spaniel is a favorite. This dog is long and massive in the body, with a long silky coat, short in the leg, ears that are long and flapping, white in color, with liver or lemon markings on the head and ears.

The clumber is a good water dog and a most useful dog for sporting purposes. He works about twenty yards in front of the gun at a steady trot or slow, hard gallop. He is trained to stand or drop with a movement of the hand, or at the moment that the gun goes off, or when the game is flushed and flies. This dog will also retrieve game.

The spaniel is a slow dog, but does not tire easily. Spaniels make very good pet dogs. There are several varieties of small spaniels, useful only as toy or lap dogs.

Watch Dogs. — As the term implies, the dogs of this class are used for purposes of protection. They may serve this purpose in two ways: they may be strong and ferocious, and thus be

able to attack the invader; or they may be alert and watchful, barking at the approach of an intruder, thus arousing their masters. Any dog may be a good watch dog, but there are certain

MASTIFF.

breeds which possess qualifications of strength, ferocity, and alertness, and which therefore are specially fitted to serve as watch dogs.

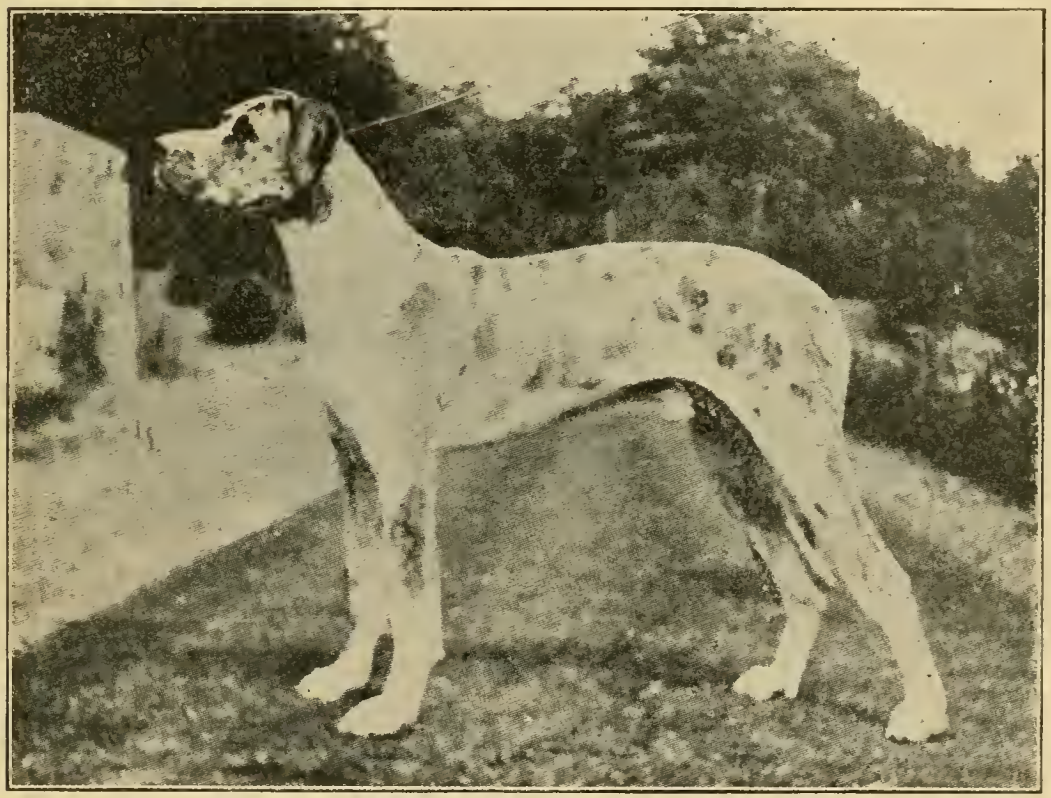
Among the breeds so constituted are the Mastiffs, Great Danes, Newfoundlands, Bulldogs, Bull Terriers, and Irish Terriers.

The *mastiff* is a very old breed. These dogs are very large and powerful, being easily capa-

ble of overthrowing and overcoming even a strong man.

The *great Danes* are also very large and powerful dogs. They have a slate-gray color and are taller than the mastiffs, but not so heavily built.

The *Newfoundlands* are large, shaggy dogs of a jet-black color, with white or tan mark-

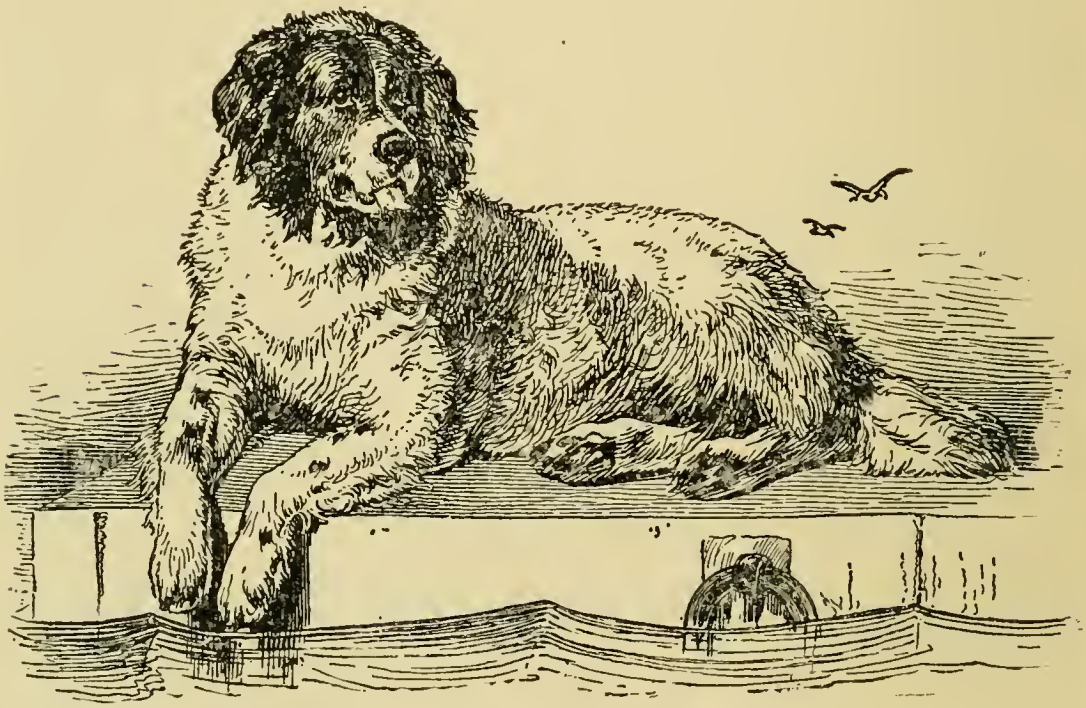


GREAT DANE.

ings on the breast. They are great favorites in America, and make good companions as well as watch dogs. They are very powerful and brave. They become deeply attached to their masters and as a rule are very fond of children.

The breed is supposed to have come from the island of Newfoundland, where they are used to draw small carts.

The Newfoundlands are strong swimmers. Their long, powerful paws, with weblike skin



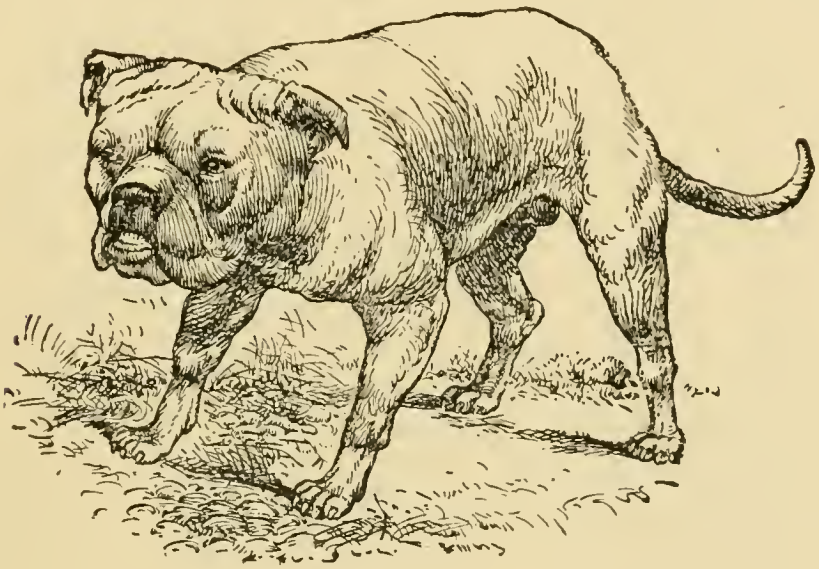
NEWFOUNDLAND DOG.

between the toes, make them specially fitted for swimming. They are known to have saved many human beings from drowning.

The *bulldog* is not a large dog, but very powerfully built, and ferocious and brave when roused. He was formerly used in the old-time sport of bull baiting, therefore strength of jaw, ferocity, and tenacity were necessary qualities. The bulldog does not make friends readily, but he becomes greatly attached to his master.

The *bull terrier*, being a cross between the bulldog and the fox terrier, resembles the bulldog in many ways, but is much more active and uncertain in temper.

The *Irish terrier* is a plucky, handy dog, good tempered to his master, but somewhat inclined



BULLDOG.

to look upon all other dogs as his natural enemies, and to fight whenever he gets the chance. His coat is wire-haired, somewhat long, and is reddish brown in color.

Draught Dogs. — By this we mean dogs which are used for drawing loads. You have read that in the island of Newfoundland the dogs which bear the island's name are used to draw small carts or sleds, laden with wood, fish, or other articles.

In Arctic regions dogs are used for dragging sleds over the great snow and ice fields. The dogs

are light and consequently do not sink into the snow, as would horses or other heavy draught animals.

The Arctic dogs are called *Eskimo dogs*, and

ESKIMO DOG.

have very thick, bushy coats, with small eyes set obliquely. They have thus a decidedly wolfish appearance. In Alaska these dogs have been of great value to miners and explorers.

Sheep Dogs. — We now come to the sheep dogs, the most intelligent and the most useful of all our dogs.

Have you ever thought that in many parts of the world, and in parts of this country, it would be impossible to rear sheep if there were no sheep dogs?

In the Highlands of Scotland and many other mountainous regions, and in countries where there are huge flocks of sheep scattered over thousands of acres of poor soil, as in some parts of Australia, where five acres will support only one sheep, the sheep dog is an absolute necessity.

Without a dog it would require more money spent in labor to manage a flock of sheep, gather them from the hills, force them into their folds, and drive them to market, than the whole flock would be worth.

In this country the sheep dog drives the sheep before him, but in some countries the sheep follow the shepherd, and the dogs simply defend their flocks against beasts of prey and robbers.

In South America the sheep follow the dog, and this is how it has been accomplished: —

When the dog is quite a puppy it is taken from its mother and placed with a sheep mother, who rears it amidst the other sheep as she would her own lamb. The dog, when grown up, shows no desire to leave the flock. The sheep get used to the dog, and the dog gets used to the sheep; but, curiously enough, the dog

gradually assumes the position of leader of the flock.

Travelers tell us that when one approaches a flock of these sheep the dog immediately advances, barking, and the flocks close in his rear for protection, just as they close in the rear of a leading and protecting ram.

The dog has been trained to come daily to the shepherd's house for food, though it may be several miles off; on receiving his food, he returns to guard the flock.

These intelligent dogs have also been taught to bring the flock home, without aid from their masters.

The varieties of sheep dog now in most general use are the well-known Scotch collie and the less-known old English sheep dog, with a short stump of a tail, known as the bobtail sheep dog.

The Scotch collie is a wolfish-looking dog, with semi-erect ears and pointed nose. He has a long, shaggy coat, black on the main part of his body, with white on his breast and legs. Around his mouth the hair is shorter and tan-colored. The tail is long, covered with long, shaggy hair, and is carried in a drooping position.

In consequence of the sheep dogs being all day, and perhaps all night, with their masters, who know their own minds and see that what

they say is carried out, they have developed remarkable intelligence. Every word, look, and gesture of their master is understood and obeyed.

SCOTCH COLLIE.

At one word or wave of the hand these clever dogs will round and drive to the fold sheep scattered over miles of hill and dale, and not one will be missing.

And, what is even more wonderful, they will turn out any strange sheep that may get with their flock.

How to train Sheep Dogs

In training dogs, remember this, never change your mind. Be patient, but very firm; see that

you are obeyed, and under no circumstances lose your temper.

If you wish a dog to lie quietly, say, under the table or in a corner, so as not to be a bother, or to get in the way while you are having your meals, always make him go there: don't make him lie there one day, and another day call him away.

A certain word and gesture ought to mean that he is to perform a certain act. Always, then, use the same word and gesture when you wish him to do that particular act.

Dogs are often ruined and made great nuisances to themselves and everybody about them because their masters or mistresses have not strength of will.

Here is another important point. If you wish to keep your dog in good health, don't overfeed him; it is cruel to give a dog too much food when he gets little or no exercise. It is better for the dog to let him be thin than too fat.

Remember that naturally a dog had to hunt most of the day for his dinner, and, when he captured it, there was probably barely sufficient to satisfy him.

The quantity of food which should be given to a dog depends on the size of the dog and the amount of exercise he takes; but as a

rule, one feeding a day is sufficient, and then only just what the dog will eat up with relish.

As you know, we give off our superfluous internal heat by perspiration through the pores of our skin, that are situated all over our body; but a dog can perspire only through its tongue. Therefore it is of the utmost importance that dogs should be able always to get at a plentiful supply of fresh water — especially is this necessary for dogs with long coats, like sheep dogs.

To neglect giving water to any dog, especially a long-haired one, is brutal. The suffering that the poor beast must endure on a hot day from lack of water is terrible.

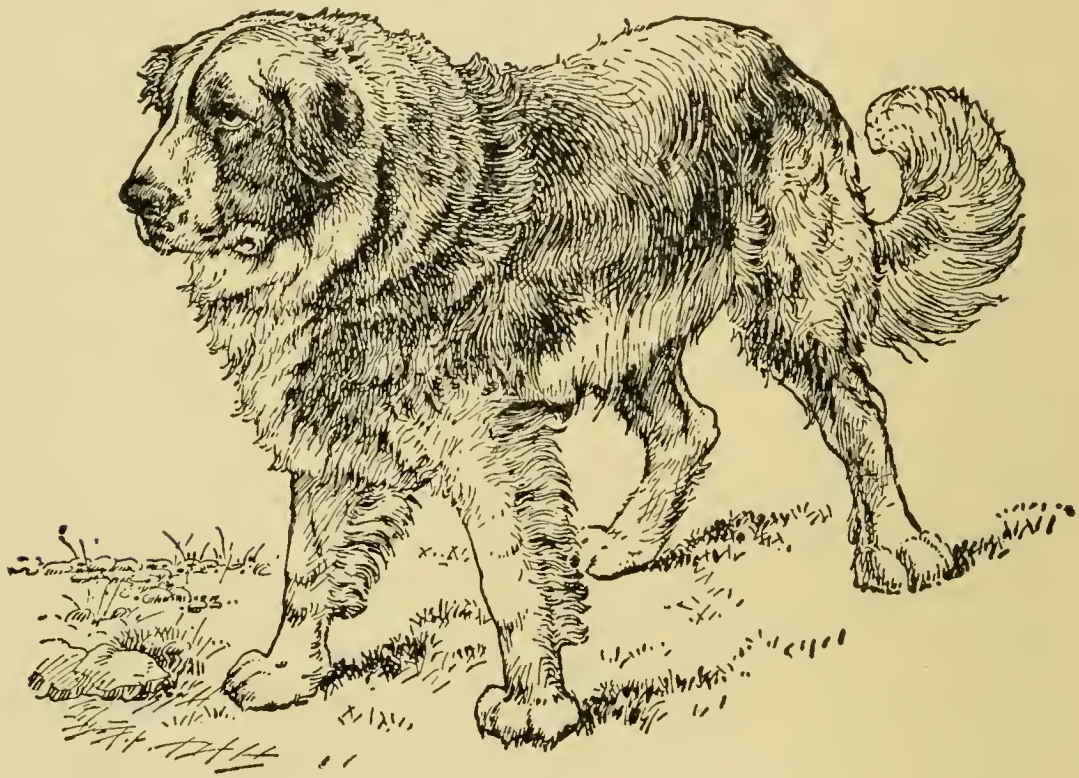
Life-saving Dogs. — In this class we will consider the fine St. Bernard dogs, which take their name from the St. Bernard Pass in the Alps, where for many years these noble animals were used to rescue travelers who had lost their way during the frequent and blinding snowstorms which occur in that region.

The St. Bernard dogs are very large and powerful animals, with a long, heavy, and thick-set coat. Their color is usually a light brown, spotted with white on the breast and legs, and sometimes on the main portion of the body.

In our country the St. Bernard dogs are rather sluggish, owing, no doubt, to the warmer climate. Some make excellent watch dogs, and

they are chiefly used in this country as man's companions.

Toy Dogs. — In this class we have placed those dogs which, as the term implies, are mainly mere toys. These are the various kinds



ST. BERNARD.

of house and lap dogs, which are often foolishly treated and indulged and given attention equal to that bestowed upon some children. Some of these dogs are kept merely as curiosities, usually on account of their diminutive size. We cannot do more than mention a few of the most common varieties of these toy dogs, and these are the Skye Terrier, Pug, Black and Tan, Mexican Hairless, and Chihuahua.

Skye Terriers, or Scotch Terriers, are small dogs, with long, silky coats, which often have a silvery sheen. These dogs often serve as excellent mousers or rat dogs, so we may consider them as something more than mere toy dogs.

Pug Dogs. — These dogs vary in size. They are heavy and thickset for their size, and have

BLACK PUG.

a decidedly short and upward turn of the nose, hence the name "Pug." They are a light dun color with black faces.

Black and Tan. — These are very small and slender dogs, with short, coarse, black hair, and tan markings under the mouth and on the neck,

breast, and legs. Some of the black and tan dogs make good mousers.

Mexican Hairless. — These dogs are, as indicated by the name, almost wholly without hair. They are about the size of a fox terrier. They are only curiosities, and in colder climates are very susceptible to cold. They are not what might be called attractive in their appearance, and besides the curious absence of hair, have nothing to recommend them.

Chihuahua. — These very diminutive dogs come from the Mexican state of Chihuahua. They are not more than six or eight inches long, small enough to rest with comfort in one's coat pocket. They are usually white, with very short coats. They are useful only as toys or pets.

CHAPTER X

THE CAT

The domesticated cat is a most useful animal. Her usefulness is not fully appreciated, but we could not dispense with her without much loss to the community.

Perhaps there is no devastation more appalling to the farmer than a plague of rats, mice,

HOUSE CAT.

WILD CAT.

and gophers. The cat not only kills a number of these pests, but her very presence tends to keep them away from the buildings and fields, for they soon know whether the cat is a clever hunter or not.

If a house is beset with mice, the introduction of a cat, if she be a clever mouser, will soon

effect a clearance, the mice thinking it wiser to go elsewhere.

The loss every year by the depredations of rats, mice, gophers, ground squirrels, and other vermin in fields, buildings, and granaries, is enormous. We are in the habit of underrating this loss, because the vermin work so gradually that their presence is not felt until considerable damage has been done. Farmers, as a rule, do not appreciate the good work certain birds and beasts of prey do for them in destroying the creatures which do so much harm.

CANADA LYNX.

The owls and hawks destroy rats, mice, and other vermin, and therefore, if they are not in too great numbers, they are of considerable benefit to the farmer.

There can be no doubt that with the destruction of the birds of prey, especially the owl, the depredations of rats, mice, and other vermin increase. If, however, the vermin are to be kept in check, it is essential that a few good cats should be kept about a farm, not the highly

bred pet cats that hardly know how to catch a mouse, and will not face a rat when they see one, but cats that come from a good strain of mousers, noted for their pluck and indefatigable hunting powers. These cats are often lean, underbred-looking animals, somewhat wild in their habits, but certainly the best for the object in view.

Some cats have the hunting instinct so highly developed that they frequently acquire a strong liking for birds and young poultry. If only destructive birds were caught, there would be no objection — rather the opposite. It would help to get rid of some of the farmer's feathered enemies. But when a cat develops a taste for young poultry, it is time to get rid of her, because it is impossible to cure her, and she will not cease her depredations until she has destroyed all the young birds within her reach.

The Cat Family — Distinctive Characteristics

Lions, tigers, leopards, jaguars, pumas, lynxes, and the smaller species of cat are all included in the great family of the cats. All this family eat flesh, and are therefore called "carnivores." Their long, lithe bodies, which combine strength, suppleness, agility, and quickness, are adapted for the pursuit and destruction of their living prey. Their

strength and suppleness, in proportion to the weight of their body, is so great that they are able to drag down and kill animals of far greater weight and bulk than their own. In proportion

THE TIGER.

to their weight, there is probably no animal so strong and supple as the members of the cat family.

They are noted for the shortness of their hair or fur, and also for their short muzzle; their flesh teeth are very powerful; their claws work in a sheath as a protection and can be drawn in and out at will. They have five toes on their forefeet, and four toes on their hindfeet.

All the cat family walk upon their toes, and are therefore called digitigrade animals. The

hind part of the foot is entirely raised from the ground to form a combination of the leg.

The stealthly and noiseless walk of the cat is due to soft cushions or pads on the under surface of the foot; each toe has a separate pad, and behind these toe pads they have a large main

THE LEOPARD.

pad, which occupies the middle of the sole of the foot. The forefoot is furnished with six, and the hindfoot with five, foot pads.

Could any formation of foot be more suitable to allow the great cat family to crouch, to lie still, to rise and stalk their prey with rapidity, without jerk or noise, than this?

You can distinguish the impression, or track, of the cat on any ground that will receive an impression, because that track shows only the

form and number of the pads; no mark of claws is shown, because the claws are always withdrawn into the sheaths when the animal is moving about.

A cat only ejects her claws out of their sheaths when she is attacking her prey, or

Compare the markings on the tiger's skin and the markings on the kitten.

when her anger is excited. A dog's track, or impression, on the other hand, shows not only his pads, but his claws, which are not withdrawn into sheaths, being always fixed in the same position.

A cat's tongue is very rough and like a rasp. This enables it to lick the meat from the bone, and to clean the fur effectively. This may be a reason why the fur of a healthy cat is so

much cleaner, and smells so much sweeter, than the coat of the average dog. A dog's tongue is quite smooth.

The teeth of a dog are adapted for cracking

A HANDSOME CAT.

and breaking bones, which are then gulped down and assimilated by a stomach especially suitable for that purpose.

On the other hand, a cat's teeth and stomach cannot do this, and so the bones of its prey are licked clean by the rough tongue.

The fur is usually short and suited for bearing either cold or heat.

The tail is long and cylindrical, and capable of movement from side to side, curiously like the movement of a snake.

Perhaps the most remarkable characteristic of the cat family is the bristle-like hairs, known as whiskers, that fringe the muzzle. These hairs are provided with special nerves, which communicate with the brain and which act as delicate organs of touch.

These whiskers help cats in finding their way and detecting objects during their nightly wanderings. It is said that if a cat's whiskers can pass through a space, its body can follow.

Consider the delicacy of these nerves of touch that are in a cat's whiskers. The whiskers themselves are most delicately fine, and so what must these nerves be like which communicate with the brain and serve a cat so well?

As a rule, the cat family kill their own prey by the most clever scouting, combined with stalking. When seeing their prey, they use every device to get within springing distance. They will advance a few paces, then crouch, then advance a few paces again, then lie perfectly still, taking advantage of every bit of cover; or it may be, they will lie in ambush, awaiting the approach of their prey, until it gets within a certain distance, and

then they will pounce upon it with a sudden rush and spring, at the same time driving home their terrible claws. If you watch your cat hunt a mouse or a bird, you will see all this.

Where First Domesticated

The ancient Egyptians tamed and trained the wild yellow Kaffir cat of their country. The Egyptian fowler is said to have trained this cat, so that when he went fowling he took a cat as his companion, and it was taught to retrieve the bird that dropped to his throw-stick and fell amongst the tall grasses of his native swamp.

This cat is supposed to be the parent stock of our domesticated cat, but it has probably been crossed with the wild cat of the different countries into which it was introduced.

Owing to the cat's uncertain temper, its unsociable nature, its propensity to attach itself to places rather than to human beings, its natural habit of sleeping during the day and wandering forth at night in search of food, and its other noiseless and solitary characteristics, it was not well adapted to become man's close companion.

And as its natural habits made it almost impossible for man to make the cat his companion

and friend, he has interfered very little with its natural ways and disposition.

The cat, therefore, still remains partially a wild animal, and will, on the slightest provocation, take to a wild life with little difficulty. In other words, it easily reverts back to type. Many of the so-called wild cats are domesticated cats which have become wild, or are the descendants of these reverted cats.

If a terrier is lost in a wood, it is almost as helpless as a babe; but if a cat is lost in a wood, it is very quickly at home, and soon loses every trace of domestication.

Domesticated Cat

A good mousing cat will kill, it is said, ten mice a day, and put to flight out of a building a vast number more.

Different breeds of cats are not so marked as to size, shape, and habits as are the different breeds of dogs. Cats generally differ only in color, length of hair, and length of tail.

Owing to the dog's natural disposition, man could train it and use it for several different purposes, therefore he bred and selected with this object in view; but owing to the cat's natural disposition, he could not utilize it in the same ways, and therefore he did not attempt to interfere much with its natural characteristics.

This is probably the reason why the differences between breeds of cats are not so marked as those between breeds of dogs.

There are cats of many different colors and markings, but very few distinct breeds. Per-

PERSIAN CAT.

haps only two breeds are extensively known in America. These are the Maltese and the Angora or Persian.

The Maltese cats are handsome cats of a solid bluish gray color. They make good pets, and if not too highly fed, are fairly good mousers.

The Angora or Persian cats are white and have

very long hair. The longer the hair the more highly prized they are. There are some highly bred Angora cats with long, curly hair, especially about the neck. These cats are not useful as mousers. They are kept more as curiosities than for any other purpose.

The different colors of the common domesticated cats are gray, black, white, sandy or yellow, Maltese, tortoise-shell. These colors may be solid or in mixture. There being no attempts at systematic breeding, there may be all colors and markings in the same litter.

Cats are said to possess limited powers of smell.

In securing its prey, the cat depends on its highly developed sight, the exquisite feeling in its whiskers, its softness and evenness of movement, its clever stalking, the accuracy and suddenness of its pounce, and the force and power with which it can drive its claws into the body of its victim.

As has been said, the cat is unsociable, preferring to hunt its prey in solitude and generally at night.

Cat and Dog Compared

The cat and dog have very different ways and habits. A cat is usually independent; a dog, dependent. A cat is secretive; a dog is usually open. These different ways and habits are prob-

ably the result of the different kind of wild life their respective wild ancestors were compelled to adopt.

The wild ancestors of the dog, probably wolves and jackals, lived in packs, and therefore had to obey a rough kind of social dog law. They gave each other mutual assistance in the searching, finding, running down, and killing of their prey; in guarding their community from harm and danger, by means of barks and growls; and by uniting to defend themselves or to attack their enemy. They did not attach themselves to places, but wandered over large tracts of country, sleeping where they stopped for the night.

Such a life fixed in the dog certain sociable instincts, which, when trained and developed, became of the greatest use and pleasure to man. Every movement of a dog shows that he is a sociable animal, and that his wild ancestors lived in packs: the movements of his tail, his attitude when meeting a friendly or strange dog, his greedy manner of eating, his great attachment to his master and his manner of defending and guarding him, the wisdom he will show in finding and returning game, his manner of showing joy and fear and other emotions.

That he did not attach himself to places is shown when a dog lies down. He will twist round and round on a rug, as if he were smooth-

ing down the long grass, to make himself a comfortable sleeping place for the night. Wolves and jackals, when exhausted after their day's hunt, will smooth the grass down by turning round and round, so as to prepare a comfortable bed for themselves.

A dog's manner of digging a hole and burying a bone in it is the old ancestral trait, when food was scarce and precarious, of laying up the little store that was over, against the day when his hunting ended in failure.

The manner in which a dog will follow his master was first learned when the members of a pack followed and obeyed the leader of the pack. The spread of a pack of foxhounds through a covert, with their tails wagging and quivering, as they search for or find the scent, are so many signals to the other members of the pack, and were first of all acquired when their wild ancestors lived and hunted in communities.

Dogs living in packs acted with no concealment of their doings, hence the desperate haste to gobble down the bit of prey they were fortunate enough to seize, lest another and stronger dog of the pack should snatch it away.

Now consider a cat's habits: —

A cat seldom or never cares to be in the company of other cats; she prefers to hunt alone, and at night; she attaches herself to a house

instead of to her master, showing that the wild ancestry attached themselves to a particular spot or lair, a cave, a hole in a rock, the hollow of some tree, or some other place of safety. Their delicacy and slowness in eating prove that they took their time to eat their food; the male, female, and young together, not with a number of other hungry or half-famished cats all around, ready to seize on the piece that a fortunate cat had been lucky enough to secure. Their great natural cleanliness of person and habits were acquired so that their lair might be kept sweet and clean.

A cat never hides away a bone like a dog.

Almost every habit that we observe in our dog and cat can be traced to the different methods that the families of dogs and of cats were respectively compelled to adopt when in a wild state in order to make a living and to rear their offspring.

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